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THE
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JOURNAL OF PHARMACY,

PUBLISHED BY AUTHORITY OF THE
PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY

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AND

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Professor of Pharmacy in the Philadelphia College of Pharmacy.

ASSISTED BY A PUBLISHING COMMITTEE, CONSISTING OF

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PHILADELPHIA COLLEGE OF PHARMACY.

The Annual Course of Lectures in this Institution will commence on Tuesday evening, October 17th, and be continued for six months.

On Materia Medica, by JOSEPH CARSON, M. D.

“ Chemistry, “ ROBERT BRIDGES, M. D.

“ Pharmacy, “ WILLIAM PROCTER, Jr.

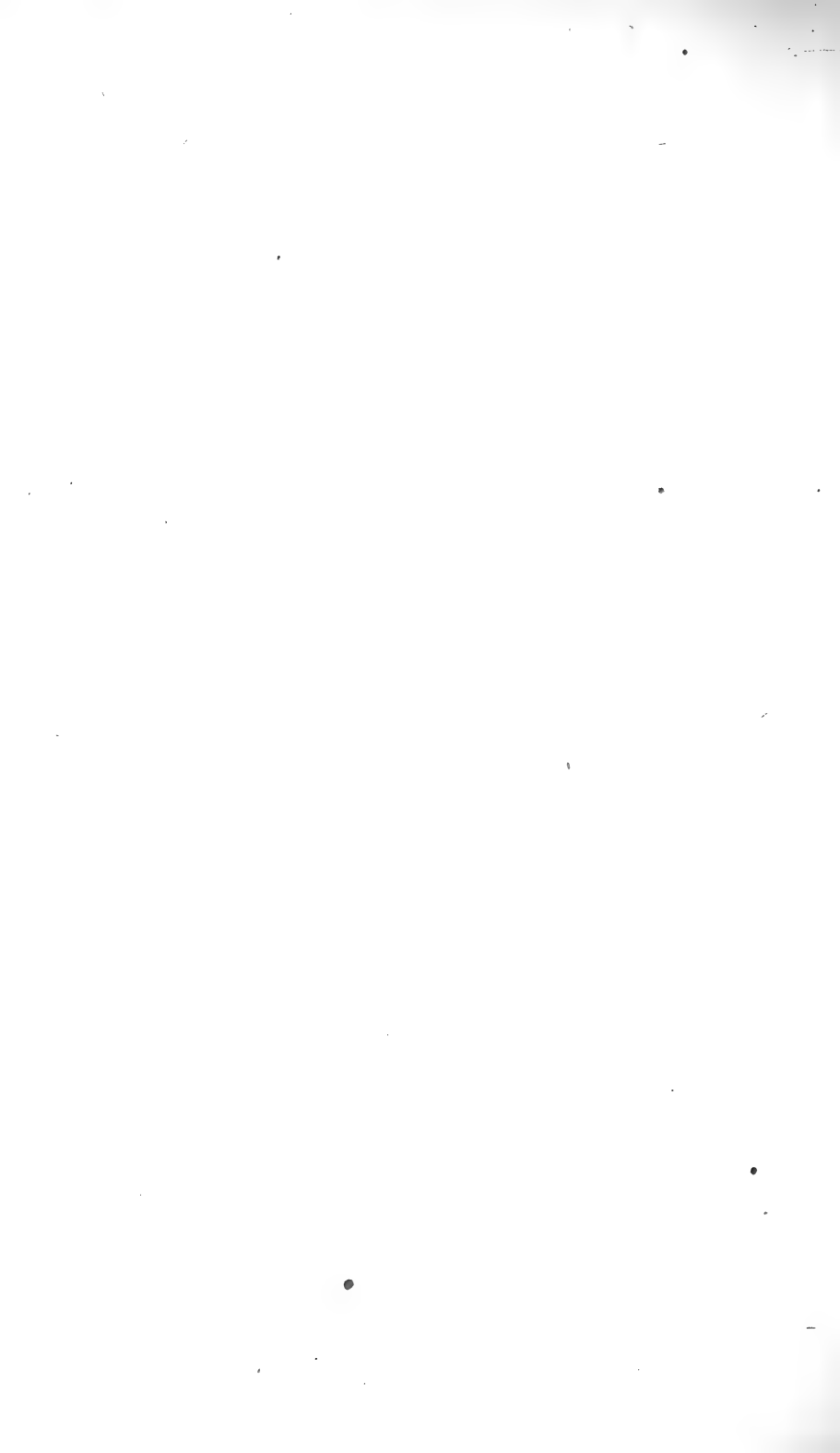
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October 2d, 1848.



THE AMERICAN JOURNAL OF PHARMACY.

JANUARY, 1848.

ART. I.—AN ESSAY ON SCAMMONY, WITH AN EXAMINATION INTO THE QUALITIES OF THE DRUG FOUND IN THE MARKET,

Read before the College of Pharmacy, December 6th, 1847.

BY JOSEPH CARSON, M. D., &c.

THE subject of scammony at the present time is a deeply interesting one. As one of the oldest articles of the *Materia Medica*, it commands attention. Its history is curious, and the value which is found attached to it in the earlier records of medicine, prompts to the investigation of its present claims to regard and confidence. It is generally understood that the drug is of doubtful character, but few are aware that there is so great a reduction of its value, so great a dissimilarity of its physical and sensible properties, and so extensive a misconception of the true qualities which pertain to it. What is written in the works on Pharmacology may be familiar to those who investigate such subjects, but until the difficulty of procuring even tolerable specimens of the article is encountered, they can not be forcibly impressed with the remark of Dr. Christison, "that scarcely any of the descriptions in systematic books, especially in the English language, convey a correct idea of the scammonies of the present day, at least of those to be met with

in the British market;" which circumstance he further states, "can only be accounted for by supposing that authors have copied one from another, for some considerable time, instead of examining the commercial varieties of the drug for themselves." The application of these statements to this country is equally pertinent, and the present communication has been prepared, that the attention of this College may be directed to the topic, in which its members are deeply concerned. In preparing the essay, it has been thought, that it would be more satisfactory to treat of the subject as a whole, than merely to present the facts which some research has elicited; that while the existing state of things is exhibited, prominent points of comparison may be afforded, and the whole truth if possible arrived at. In so doing, the proper credit will be awarded to those writers who have assisted the undertaking.

The first writer on scammony, in whose treatise any attempt at description is met with, is Dioscorides. He was a native of Cilicia in Asia Minor, and lived during the second century; he wrote in Greek, and his book has been much an object of comment. The description of the plant is defective, but yet so given as to apply to the species which has since been recognized as the true one, the *Convolvulus scammonia* of Linnæus, Sp. Pl. 218. It was called *Scammonea syriaca* by Bauhin, Pin. 294, by Ray, Hist. 722; and *Convolvulus syriacus* by Morrison Hist. and by Tournefort. *Syrian Bind-weed*, was the common term applied to it. Sibthorp in his *Flora Græca*, has introduced the species of Linnæus by its name *C. scammonia*, and says, "that from this species Aleppo-scammony is prepared." He met with it at Rhodes, but he has thrown a doubt over the question of identity, with respect to this species and that of Dioscorides, and supposes that the latter was the *C. farinosus*. In treating this subject, Professor Lindley remarks, "upon what ground Dr. Sibthorp referred the scammony of Dioscorides to *Convolvulus farino-*

sus of Linn., a Maderia plant with slender roots, and no appreciable quantity of resin, cannot now be ascertained, for there is no specimen of *C. farinosus* in his herbarium." Professor Lindley has further shown, that if the reading of the Aldine edition of Dioscorides, of 1499, be taken, in which the Greek word for *thick* instead of that for *hairy* is employed, as applied to the branches, the description agrees with the modern plant.

Matthioli, the chief commentator upon Dioscorides, in his Latin translation, renders the description in the same manner. Upon consulting the edition of his work published by Bauhin, at Basil in 1598, it does not appear that any doubt existed with respect to the plant described by Dioscorides, and that which was placed at the disposal of the translator, by the Imperial Ambassador at Turkey, (Seigneur Angerius de Busbecke,) from the court of the Emperor Ferdinand. Of the plant thus procured he has given an excellent figure, which corresponds with those since published by Woodville and Nees von Esenbeck. This is the *C. syriacus* of Morrison cultivated in England, by Collinson.

The locality to which Dioscorides referred the best scammony was Mysia, a portion of Asia Minor, near the Pontus Euxinus, and he states that this is preferable to that of Syria and Judea. Matthioli has stated, that in his day it was brought from Alexandria and Syria by way of Venice. Tournefort (*Voyage into the Levant*) met with the drug at Samos, and stated that the plant shown to him corresponded to the description of Dioscorides; he says the same of the Syrian plant. Belon met with the plant at Candia, which he says grew wild on the mountains; (ed. 1553, *Travels*.) M. Hasselquist, a Dutch naturalist, more recently has said that the best comes from Marach, (where resides a Pacha,) four days' journey from Aleppo, near the frontiers of Armenia, and that he has seen the convolvulus in the valleys between Nazareth and Mount Carmel. Finally,

Captain D'Urville met with the plant at Cos. It is evident then that the plant is not confined to any one locality, but has extended and now extends through the Levant, which is an additional reason for assuming that the present plant and that of the ancients are the same. There appears, indeed, to have been no dissent, except in the case of Dr. Sibthorp.

In tracing the history of the drug, the fact is apparent that the estimation of the quality of it, as produced in different places, has undergone revolution; thus Dioscorides eulogizes the Mysian scammony, stating that it is bright, clear, clean, ash coloured, spongy and porous, while that from Syria and Judea is the worst of all, as it is massive, weighty and sophisticated with tithemalus, (*Euphorbia*) and fecula of the orobus (lentil.) Tournefort wonders that it should have been preferred to that of Judea, which is the same as that of Syria. Matthiolus, as we have stated, indicated the source as Alexandria and Syria. As a consequence, the trade in it assumed new directions, and new locations became prominent, from which have been derived specific appellations. Upon Aleppo, as a depot, the article was concentrated, which was of the best kind, and hence the designation *Aleppo Scammony*. According to Hasselquist, it was brought there in small sacks. The appellation of Smyrna scammony, according to Tournefort, originated in the circumstance that the product of Natolia was carried to Smyrna.*

But other causes have been operative in changing the course of supply; thus St. Jean D'Acre was once a port of exit, but it was abandoned, as the Arabs plundered the caravans on their way to it from the neighbourhood of Mt. Carmel. St. Jean d'Acre is mentioned as one of the ports of shipment by Pomet, (ed. 1695.) The distinction between Aleppo and

* From the close proximity of Smyrna to the ancient province of Mysia, it would appear that the same locality has always produced the article, especially if, as Tournefort remarks, Natolia, which includes a portion of Mysia, furnished the Smyrna kind.

Smyrna scammony was made in commerce for at least a century and a half, it has but recently been abandoned, for reasons to be stated directly. When the *Dictionnaire Universel des Drogues Simples of Lemery*, of 1733, was published, the distinction between them was well established. This author has stated that the first is preferable to the second, and is "clean, light, tender, friable, resinous, grey, easily reduced to an ash-grey powder, of a stale, disagreeable odour, and a taste a little bitter ;" the latter is "more close or compact, heavier, blacker, less resinous, breaking with difficulty, less grey in powder, and whitening less the liquor in which it is dissolved." It is evident from the perusal of the description given by Lemery, of the Aleppo kind, and a comparison of it with that presently to be presented of *Virgin scammony*, that the same substance is referred to. The writers of drugs of nearly the same date, (the middle of the eighteenth century) as Tournefort, Lewis and Pomet, describe the article in the same terms, and contrast it with Smyrna scammony. In the course of time, the application of the name Aleppo was made to an article of infinitely inferior quality, fabricated from the pure drug, and sufficiently differing from Smyrna to maintain the impression that it was genuine.

The question now arises, why was there a difference between the two varieties just noticed? It is agreed by all authorities from Dioscorides of ancient date, to Russel in modern times, that the best, the purest product, is the result of natural exudation from the root of the plant; the description given by these writers with an interval of sixteen centuries closely correspond. Mesue, the younger, who flourished during the tenth century, an Arabian, and consequently well instructed, informs us, however, that this was not the only method, three others being mentioned, viz., by heating the root, by bruising it and compressing the juices, and by performing the same operation on the

leaves and stems. An inferior article will be thus produced. We are forced then to admit this explanation, or to assume one, which Lindley states he doubts, to wit, that the Smyrna article was the product of a different plant, (*Periploca secamone*,) this, exclusive of other reasons, (as the article has disappeared, and given place to factitious preparations,) is hardly tenable.

It has been stated that the distinction between Aleppo and Smyrna scammony has been of late years abandoned. This has been occasioned by investigations in which the English pharmacologists more particularly have been successful, and which have resulted in the disclosure of practices which most probably had long existed, but to which attention had not been directed. Smyrna is the port of shipment; to this place the pure scammony is taken in a soft state, and there fabricated to suit purchasers, according to a tariff of prices. The individuals are called scammony makers, and, as I have been informed by an intelligent dealer,* prepare a mixture of impurities, with which the scammony is commingled. As this stands, the mixture assumes the form of strata of various strengths, the greater levity of the scammony keeping it towards the top, while the heavier impurities settle to the bottom. From such preparation, the several qualities of the article are skimmed and formed by evaporation; hence, the terms first, second and third sorts. *Virgin scammony* and these sorts constitute the article of commerce. The admixture of foreign substances was an old practice, for Dioscorides, in preferring the Mysian article to those of Syria and Judea, states as a reason that the latter were adulterated with tithemalus and the farina of the orobus.

Virgin scammony in this market is at present comparatively unknown; formerly, from the statements of the older druggists, it was common; let us then exhibit its qualities and value. The name *Virgin*, is that

* A gentleman of Boston.

employed by Pereira, Christison, and Royle; it is called *Scammonée d'Alep superieure*, by Guibourt, and simply *Scammonée d'Alep*, by Fee. The following are the characteristics: Fragments irregular, apparently portions of larger masses; rough, worn, and ash-coloured externally, or as if covered with a greyish powder; friable, breaking between the fingers, or with the nail; fracture resinous, presenting shining greenish black surfaces, with here and there small cavities and greyish crevices; the thin fragments semi-transparent. Structure compact and light; becoming whitish by the application of moisture and friction, or in the mouth; having a peculiar taste like cooked butter, without bitterness, but a little acidity slowly developed, the odour being disagreeable, cheese-like, sp. gr. 1.2. The exterior coat effervesces with muriated acid, probably from the mass having, when soft, been rolled in chalk; there is no reaction with iodine, and it takes fire readily, burning with a yellow flame. Dr. Christison states that this kind is almost all soluble in boiling rectified spirits; and sulphuric ether takes up at least 77 per cent., indeed 82 or 83 per cent. if the specimen be tolerably dry. It breaks down readily in water, forming a smooth but not permanent emulsion. Several analyses have been made; those of the eminent Edinburgh pharmacologist are particularly worthy of notice. We shall give such as are important.

Christison.

	1. Old Scammony.	2. Old Scammony.
Resin, . . .	81.8	83.0
Gum, . . .	6.0	8.0
Starch, . . .	1.0	0.0
Fibre and sand, . . .	3.5	3.2
Water, . . .	7.7	7.2
	<hr/>	<hr/>
	100.00 grs.	101.4
Gain probably in water,		1.4
		<hr/>
		100.00

<i>Guibourt.*</i>			
Resin, . . . .	.	.	75.
Alcoholic ext. . . .	.	.	6.25
Gum ext. . . . .	.	.	3.12
Insoluble vegetable matter, . . . .	.	.	7.25
Earths, . . . . .	.	.	8.38
<hr/>			
			100

Marquat's analysis is more minute and elaborate; it may be consulted in Pereria's *Materia Medica*. It may be stated that one specimen gave him 81.25 of resin, another 78.5, corresponding, the first, nearly to Christison, the second to Guibourt.

Virgin Scammony. Two specimens have come under my observation.

The first corresponds to the description given of virgin scammony. Its sp. grav. is 1.3. From it were obtained:

Resin, . . . . .	.	.	70.00
Aqueous extract, . . . .	.	.	3.75
Earthy matter, . . . . .	.	.	5.00
Veg. mat. destructible . . . .	.	.	20.00
Loss, . . . . .	.	.	1.25
<hr/>			
			100.00

The residuum from alcohol was of a greenish-brown colour, the residuum from water had nearly the same appearance; both were pulverulent. The resin was of a dirty greenish-brown colour. It affords slight effervescence with muriatic acid, and does not change with iodine. This specimen was imported from London.

The second is more covered with ash-coloured powder, and in mass has a duller aspect. Sp. gr. 1.3. From it were obtained :

Resin,	.	.	.	65.00
Aq. ext.	.	.	.	4.00
Earthy matter,	.	.	.	4.25
Veg. matter, destructible,	.	.	.	23.50
Loss,	.	.	.	3.25

 100.00

It slightly effervesces with muriatic acid, and changes decidedly to blue with iodine. The alcoholic residuum had a brown ash colour; was disposed to cake when dried in the capsule. When exhausted by water, it presented a lighter colour and was pulverulent.

The *resin* was transparent, and of a brown colour. The dried *aqueous extract* was of a deep, clear brown colour, in powder glistening; entirely soluble and without taste.

The specimen was obtained from New York.

It is evident from the result of these experiments, that the two specimens examined, are inferior to those of Christison or Guibourt. The second specimen corresponds to the "*second scammony in amorphous*" pieces of Pereira.

Scammony in large regular masses. (Factitious.)

Chalky and Amylaceous.

The *first* specimen of the kind is in plano-convex cakes, four inches in diameter, an inch and a quarter thick, corrugated on the surface, between the corrugations smooth. It breaks with more difficulty than the preceding, but is brittle. The fractured surface has a deep greenish (olive) gray appearance, somewhat resinous; masses of resin appearing in detached patches; the exposed surface becoming uniformly darker. It is somewhat porous, the pores minute, with here and there shining points or cavities. In mass it gives the idea of sap sago cheese. No translucency of the edges. The powder is green ash coloured. Odour of cheese

marked. Taste marked and disagreeable. It cakes in the mouth and forms a slight emulsion. When rubbed with the moistened finger, affords some milkiness. It contains

Resin,	.	.	.	40.50
Aqueous Extract,	.	.	.	9.00
Earthy Matter,	.	.	.	6.00
Vegetable Matter,	.	.	.	32.00
Loss,	.	.	.	12.50

100.00

It slightly effervesces with muriatic acid, (chalk) and is deeply turned blue by iodine, (starch.)

The specimen was imported in 1836. It corresponds, I think, with "*β. Second Scammony*" of Pereira. At present I can find none of it in the market.

It is the article described at page 643, U. S. Dispensatory, ed., 1846.

The second specimen, in form, resembled the preceding; it is in plano-convex cakes, five to six inches in diameter, and in thickness, one and a quarter to one and a half inches. The exterior is rough and dirty ash brown; the fractured surface is dull, but in a clear light presents very minute shining particles; it is greenish brown, presenting white chalky points, and pores. The consistence is firm, a little force being necessary to reduce it to powder; powder, ash brown, rather than green. It has a cheesy odour; a disagreeable taste, and forms an emulsion in the mouth; it is somewhat gritty between the teeth. It contains

Resin,	.	.	.	45.00
Aqueous ext. (gum.)	.	.	.	7.50
Earthy matter,	.	.	.	12.50
Veg. matter, destructible,	.	.	.	30.00
Loss,	.	.	.	5.00

100.00

It effervesces briskly with muriatic acid, and is turned

blue by iodine. The inference is therefore that the earthy matter is chalk, and the vegetable matter starch. Of this kind I have found two small lots in the market, the remnants of those imported several years since. It corresponds to the "third quality" scammony of Pereira, but yet is as good as the preceding.

The third specimen I have is in masses, six inches long, four wide, and one and a half thick, rounded at the extremities; plano-convex, and divided into two parts on the convex surface by a deep fissure, running the length of the cake. Externally it is rough looking, of an ash white and slate appearance; internally it presents a speckled, deep ash hue; no resinous aspect on fracture. It is porous, friable, and readily reduced to powder; powder light ash. It has a slight cheesy odour and a chalky taste.

It is too dry to produce an emulsion by rubbing with the moistened finger. It contains

Resin,	.	.	.	.	27.00
Aqueous ext.,	.	.	.	.	5.00
Earthy matter,	.	.	.	.	6.25
Veg. mat., destructible,	.	.	.	.	58.75
Loss,	.	.	.	.	3.00
					<hr/>
					100.00

It effervesces briskly with muriatic acid, and is turned blue with tinct. iodine. This article came from New York.*

Amylaceous Scammony.

This scammony is in eliptiform masses, five or six inches in length, and four inches wide, and an inch thick; like the preceding, it is flat on one side, convex on the other, and divided on the convex surface by a deep depression running the length of the mass, and extending half through its thickness. The edges are uniformly rounded. It is of a

* Since this paper was written I have seen a specimen of the same variety in small round plano-convex cakes.

light ash colour, as if rubbed on one surface; dark slate, slightly polished on the other. It breaks with a short fracture, presenting a pretty uniform surface, darker towards the edge or outer portion, and uniformly light slate coloured in the centre. Its structure is homogeneous and dense, with few and very minute elongated pores. A few white points are perceptible on minute examination, and here and there exceedingly minute shining particles. It breaks down like starch that has been wet and dried, affording a uniform ash powder. It has a rancid cheese-like odour, and a nauseous rancid, somewhat bitter taste. It contains

Resin,	22.
Aq. ext.	7.00
Earthy matter,	2.50
Veg. mat., destructible,	60.00
Loss and water,	8.50
	<hr/>
	100.00

It produces a deep blue with iodine, and effervesces with muriatic acid. This specimen was derived from New York.

Gummy Scammony.

In cakes or masses doubly convex, six inches wide and one and a half inches thick, polished and dark brown externally, internally greyish brown, hard, horny, homogeneous, with great difficulty broken, fracture rough, edge of fracture semi-transparent, odour decided, somewhat gritty to the teeth, gummy to the taste, rendering the saliva viscid but not opaque, shining and sticky when moistened; when rubbed with the finger giving a tenacious mucilage, dirty but not milky; powder dirty gray; with great difficulty reduced to powder. It contains

Resin,	13.00
Aq. ext.	35.00 grs.
Earthy matter,	10.00
Veg. matter, destructible,	37.50
Loss,	4.50
	<hr/>
	100.00

The constituent of which the greater part of this is made, is soluble and insoluble gum, which I presume to be gum tragacanth from its behaviour with water. It slightly effervesces with muriatic acid, and is changed to a brown with a slight tinge of blue by iodine. This specimen was obtained from Boston. Considerable quantities are in the market.

Another specimen in similar sized and shaped masses, presents a rough earthy surface; it is lighter coloured internally than the preceding, and breaks with a horny rough fracture. It has a decided odour, is mucilaginous and bitter to the taste, somewhat gritty to the teeth, and forms with moisture on the finger a viscid clear mucilage. With water it dissolves, becoming a gruel-like viscid substance.

It contains—Resin, 6.00. The remainder as above. This article is offered as prime scammony, and I have seen it in several forms and in quantity in the market.

Black Gummy Scammony.

The specimens I have examined of this kind had the form of the preceding; externally they are of a plumbago colour, internally iron grey. They are heavy, hard, difficult to reduce to powder, which is dark. Odour slight, and taste viscid and gritty. From one of the specimens I obtained ten per cent. of resin. The residue seemed to be made up of tragacanth and bone black, the latter substance existing in patches unmixed in a second specimen. This scammony is in the market in large quantities.

Factitious Smyrna Scammony.

Two specimens of this I have met with. It corresponds to the description given of it by Pereira. "It is blackish and has externally a slaty appearance. It breaks with difficulty, its fracture is dull and black. Its sp. gr. 1.412. Moistened and rubbed it evolves the smell of guaiacum. Boiled with water it yields a turbid liquor, (which is not rendered blue by iodine,) and deposits a black powder; the

latter boiled with alcohol, yields a solution which becomes^s greenish blue on the addition of nitric acid, showing the presence of guaiacum.” The specimens I have met with are in half cakes.

Montpelier Scammony.

This article is common in this market. It is well described at page 645 of the U. S. Dispensatory, ed. 1846.

Upon reviewing our investigations, it will be found that the same range of varieties has been exhibited as that presented by Christison, but there is a marked inferiority even with the best of them, as compared with his specimens. The kind chiefly composed of gum, is new so far as I have met with any account of it, and as it is plentiful, indeed the most common in our market, druggists should be on the alert to reject it.

There are certain properties which have been depended on in judging of the quality of scammony, these are the odour and taste, and the kind of solution which is produced by wetting and rubbing it. The odour is as decidedly cheesy and disagreeable in the worst specimens as the best, if not more so, and the taste is mucilaginous and nauseous, so much so, as to induce the belief that they are produced artificially ; and with respect to the milky solution, it must be apparent, that a mixture containing gummy compounds will undergo the same change by the operation usually practised. In fact there is no mode of determining the value of the adulterated article, except by the examination of its constituents.

In concluding the subject it may be remarked, that unless some decided stand is taken by the consumers of this drug, it would be as well to abandon it. The article is worthless as it exists in the market, serving to contaminate the preparations into which it enters, rather than afford to

them an increase of efficacy. The pure drug has in ancient times been called, to distinguish it, "the purgative," and more recently "one of the pillars of physic," titles which in our day and our own city, may properly be changed to *the opprobrium of pharmacy*.

ART. II.—ON CALISAYA EXTRACT.

BY CHARLES ELLIS.

THE object of this notice is to induce an examination and trial of a preparation from the Calisaya Bark, which may perhaps be found to be a valuable addition to the list of medicinal agents.

The residuary product left after the crystallization of sulphate of quinia, known by the name of impure sulphate of quinia, extract of quinia, and precipitated extract of bark, has long been employed in this country as a remedy in intermittent fevers. It is analogous to chinoidine and contains amorphous quinine, an interesting article upon which, from the pen of Baron Liebig, was published in Vol. 18, No. 3, of the American Journal of Pharmacy. According to this writer, the chief constituent of chinoidine bears the same relation to quinia that uncrystalline sugar does to crystalline, in fact that it is amorphous quinine. These facts are sufficient to show that the calisaya bark (*Cinchona flava*) has other constituents, besides its crystallizable alkaloids, of too much importance to be overlooked.

The article under notice, containing as it does, all the quinia and cinchonina in the bark, must necessarily be a more valuable preparation, than one from which those important

vegetable alkalies have been separated by crystallization, so far as is usually the case in the manufacture of sulphate of quinia.

The frequent demand for an extract of calisaya bark, upon which reliance may be placed when administered in small doses, and the preference often given to it by physicians, over the sulphate of quinia, are sufficient reasons, without any claim to novelty, for introducing such a preparation through the pages of our Journal. In order to distinguish it from the officinal *Extract: Cinchonæ*, as well as from the residuary product alluded to above, the name of Calisaya Extract (*Extractum Calisayacum*) is proposed.

The following is the mode of preparing it.

The Calisaya Bark (*Cinchona flava*) finely bruised two pounds, boil in a gallon of water acidulated with f.℥ss. Acid Hydrochloric; strain and boil the residue in two successive portions of water, of one gallon each, with a similar quantity of acid. To these decoctions mixed together, add about ℥ij. or a sufficient quantity of lime, previously reduced to powder by the addition of water. Stir the mixture well, and set it aside until precipitation ceases to take place.

This precipitate being strained off, is to be well washed with water, dried and digested in hot alcohol, until all the taste has been exhausted; then distil off the alcohol, and carefully evaporate the product over a water bath to a pilular consistence.

This extract will contain the quinia, the cinchona, and all that can possess any medical value in the bark. It will be found to be intensely bitter, and if a selection of the true calisaya bark has been made, it is believed that the product thus obtained, will prove a very efficient remedy, in doses but little larger than those in which the sulphate of quinia is usually administered.

The proximate principles of the bark will remain in this preparation, in the state of alkaloids, uncombined with acid

which is thought preferable for the more common mode of administration in pills. If a solution is wanted, the addition of a few drops of sulphuric acid will assist in rendering it entirely soluble in water, and will convert the vegetable alkalies into sulphates.

It may be given in doses of from one to four grains; medium dose two grains, and is applicable to the same character and form of disease in which bark in substance, and the sulphate of quinia, are usually administered.

ART. III.—ON SUBNITRATE OF BISMUTH.

BY EMIL NOLLENBERGER,

Apothecary, U. S. Naval Hospital, New York.

MR. TURNER, of London, manufacturer of Pharmaceutical preparations, requested me, during my residence there, to undertake some experiments on the cheapest and most practical methods of preparing subnitrate of bismuth in a pure and white state. The following process gave me the most satisfaction, by yielding a preparation of splendid whiteness and purity.

I weighed four parts of pure nitric acid, spec. gr. 1.20, in a glass jar and put a porcelain funnel, which was pierced with small holes, in the jar, so as to reach about two inches under the surface of the acid, I then put one part of granulated bismuth in the funnel, and put the whole apparatus in a moderately warm place till all the bismuth was dissolved. (It is necessary to put it aside somewhere that the nitrous acid may do no harm.) When all was dissolved, I diluted the solution with as much distilled water as it

would bear without getting turbid, and filtered through doubled paper. To the filtered liquor I added for one pound of metal, one ounce of nitric acid, evaporated in a porcelain dish very slowly, and crystallized while cooling. After having dried the crystals, I dissolved them again with the aid of a little heat in two and a half parts distilled water, filtered the liquor and poured it, constantly stirring with a glass rod, in twenty-four parts boiling distilled water, suffered the precipitate to settle at the bottom of the vessel, drew off the supernatant liquor with a glass syphon, and again poured hot distilled water upon it, repeating that operation three or four times more. I then collected the precipitate on a filter, washed it yet several times with distilled water, and dried it at last on paper spread over a slate of plaster of Paris. The precipitate was of a beautiful white, nearly as much in weight as the metal used, and quite free from arsenic, while the metal I used contained a considerable quantity of it, because the arseniate of bismuth which is formed by the solution of the metal in nitric acid, remained after the filtration of the solution of nitrate of bismuth.

ART. IV.—ON PREPARING PURE CUBEBIN.

BY EMIL NOLLENBERGER.

Apothecary, U. S. Naval Hospital, New York.

WISHING to prepare pure Cubebin in large quantities, I tried many experiments to find out the cheapest and most practical mode. The following I found to answer best.

The cubebs are first coarsely powdered and macerated with a sufficient quantity of water in a copper still for twenty-four hours, then distilled as long as volatile oil passes over. After drying the residue, it is exhausted with alcohol, spec. gr. 0.85; the tincture is then put in a still and the alcohol driven over. The resinous matter which remains in the still is put aside for several days, till it forms a mass of crystals, which are placed on a strainer where the soft resin is almost entirely separated. The remainder on the strainer is dissolved in three or four times its weight of boiling alcohol, spec. gr. 0.90, and the supernatant portion decanted while warm, from the precipitated resin, when upon cooling the cubebin crystallizes. By dissolving it again in hot strong alcohol and filtering it through animal charcoal, it is obtained in beautiful white, needle-shaped crystals.

REVIEW.

ART. V.—GRAY'S SUPPLEMENT TO THE PHARMACOPŒIA ; BEING A CONCISE BUT COMPREHENSIVE DISPENSATORY AND MANUAL OF FACTS AND FORMULÆ FOR THE CHEMIST AND DRUGGIST, AND MEDICAL PRACTITIONER. ENTIRELY RE-WRITTEN, RE-ARRANGED, AND CONSIDERABLY ENLARGED. By THEOPHILUS REDWOOD, Professor of Pharmacy to the Pharmaceutical Society of Great Britain. London. Longman & Co. &c. 1847. pp. 1118.

THOSE who are acquainted with the "Supplement" of Mr. Gray, as published in 1836, and anterior, will remember it as a curious mixture of important pharmaceutical facts, and rubbish, with but few claims to a regular treatise on pharmacy. The object of the writer was apparently to bring before his readers the greatest number of formulæ and statements, without much care as to their value or truth ; in many giving recipes for adulterations, and thus encouraging the already existing proneness to sophisticate medicines.

The "Supplement," nevertheless, proved a valuable work of reference to the dispensing apothecary, from its being a kind of encyclopedia of recipes, synonyms, plants, etc., which the very copious index presented in a lucid arrangement, and doubtless was completely adapted to the state of pharmacy in England at the time it was written.

With a knowledge of all this, it was with pleasure that we read the announcement of a new edition, under the auspices of Mr. Redwood, and flattered ourselves that he would model the work into a regular treatise on pharmacy, as well as prune it of the trashy portion. We have therefore, with some regret, found that the present work presents no claims to a scientific compend, but retains the general

features of the earlier editions, with the very striking difference that the objectionable recipes have been omitted, an alphabetical arrangement adopted in the formulary, and the arrangements of Cuvier and De Candolle applied to the extended catalogue of animals and plants used in medicine.

The first hundred pages are devoted to weights and measures, specific gravity, thermometrical tables, tables of solubility, pharmaceutical calendar, &c.

The following five hundred pages are taken up with a catalogue of animals and plants, arranged according to the natural systems, including all that are in the remotest manner connected with medicine, and many that have no claims to such a position. The majority of them are merely noticed, whilst those that are more important are somewhat enlarged upon. As the vulgar names and scientific synonyms are given, this catalogue affords a valuable reference in the constantly recurring queries after herbs, etc., under local names.

The remaining four hundred pages are occupied with formulæ, occupied with short descriptions of substances, the whole arranged in alphabetical order. The formulary includes all the preparations of the British Pharmacopœias, those of our own not recognized in England; many from the French Codex and other French authorities, besides very many preparations not officinal, though used occasionally. Besides these, the patent medicines, veterinary medicines, enamels, varnishes, inks, cements, essences, etc., etc., are fully represented, and present an array of information not found in any similar work.

The index is exceedingly copious, occupying near one hundred pages, of three columns each, and embracing over fifteen thousand references. On the whole, we cannot but admit that the editor has acquitted himself well of the task proposed in the preface, viz: "to fulfil the objects contemplated by the original author," and that the work before us

is a very decided improvement on its predecessor. We the more readily concede this, as the editor was required to preserve the general form of the original work; and more especially because he, in conjunction with Professor Mohr, of Germany, is about to present us with a scientific work on Practical Pharmacy, which will not, we hope, be modeled after the "Supplement."

The following extracts from the work will enable the reader to infer its character more correctly.

"DRYMIS (De Cand. i. 78.)

DRIMYS GRANATENSIS.

DRIMYS MAGNOLIÆFOLIA, and two other species not well known (America;) bark, slightly bitter, very acrid, heating and aromatic.

DRIMYS WINTERI. *Winterana Aromatica*. America.

Bark, *Cortex Winteranus*, *Winter's cinnamon*, Winter's bark, thick, channelled across on the outside, grey, much cracked on the inside, solid, iron-grey, sharp tasted, aromatic, very fragrant; used in scurvy, vomiting and palsy. Rare at present, being not in such esteem as *Canella Alba*."

"ÆTHER CHLORICUS. *Chloric Ether*. *Chloroform*. *Tetrachloride of Carbon*.

These names have severally been applied to a liquid having an ethereal smell, obtained by the distillation of a mixture of weak spirit and chloride of lime.

R.	Chloride of lime in powder,	-	-	-	lbs. iv.
	Water,	-	-	-	lbs. xij.
	Rectified spirit, (alcohol,)	-	-	-	f. 3xij.

Mix in a capacious retort or still, and distil as long as a dense liquid, which sinks in the water with which it comes over, is produced.
Dumas.

This process is attended with some danger from the swelling up of the ingredients when heat is applied. The product obtained by the above process should be rectified by agitating it with several portions of strong oil of vitriol,

and afterwards distilling it from carbonate of baryta. When pure it is a dense liquid, having a specific gravity of 1.480, and a sweet taste. Its composition is $C^2 H Cl^3$. This is chloroform. It is soluble in alcohol, and in this form it is usually employed in medicine; the liquid sold as chloric ether being a mixture of the product above described, with about six or eight parts of rectified spirit."

[This is not the hydrochloric, or muriatic ether of the shops, but the substance now recommended by Dr. Simpson as a substitute for sulphuric ether for inhalation.]

"FERRI ET QUINÆ CITRAS. *Citrate of Iron and Quinia.*

R. Crystallized citric acid,	.	.	9 parts
Clean iron filings,	.	.	3 "
Quinia,	.	.	1 "
Water,	.	.	q. s.

Dissolve the acid in twice its weight of water, add the iron and apply a gentle heat until combination is effected; then add the quinine, continue the application of heat for some minutes, filter the solution and evaporate to dryness; dissolve the residue in distilled water, and evaporate the solution with a gentle heat to a syrupy consistence; spread this out on earthen plates and dry it in a stove. When dry it separates from the plates in scales."

[This formula differs from that in use here both in the proportion of quinia to citrate of iron, and in the state of oxidation of the iron. The most usual proportion is five parts of citrate of sesqui-oxide of iron and one part citrate of quinia.]

"FUMIGATIO PICIS LIQUIDÆ. *Tar fumigation.*

Put one part of tar and four or five parts of water in a pipkin, or any convenient vessel, and boil it in the apartment of the patient, allowing the vapour to escape in the room."

Oil of Tar in small quantity is advantageously substituted for tar.

GRAY'S SUPPLEMENT TO THE PHARMACOPŒIA.

“*Moxons' effervescent Magnesia.*”

R. Carbonate of magnesia, . . .	℥j.
Sulphate of magnesia, . . .	℥ij.
Bi-carbonate of soda, . . .	℥ij.
Tartrate of potash and soda, . .	℥ij.
Tartaric acid, . . .	℥ij.

To be perfectly freed from water of crystallization, and mixed and kept in a well-corked bottle.”

“**PASTA AMYGDALARUM.** *Almond Paste.* As a cosmetic for the hands, &c.

R. Sweet almonds blanched, . .	lbs. iss.
Rice powder, . . .	
Orris root powder, <i>aa.</i> . .	℥iv.
Spermaceti, . . .	℥ss.
Oil of almonds, . . .	℥ij.
Windsor soap, . . .	℥ij.
Oil of bitter almonds, . .	j℥.
Oil of bergamot, . . .	℥iij.
Otto of roses, . . .	℥ss.
Rose water, . . .	q. s.

Beat the almonds into a paste with the rice powder, orris powder, and a sufficient quantity of the rose water. Melt the spermaceti, oil of almonds, and soap together, and beat up with the other ingredients so as to form a paste.”

“**POMADE DIVINE.**”

Washed and purified beef marrow, . .	lbs. ij.
Storax, cypress wood, orris root powder, <i>aa</i>	℥ij.
Cinnamon powder, . . .	℥j.
Cloves and nutmegs, <i>aa.</i> . . .	℥ss.

Keep them melted by the heat of boiling water for six hours, then strain through flannel.”

"RED SEALING WAX, (best.)

R.	Shellac,	. . . . .	lbs. ij.
	Venice turpentine,	. . . . .	lbs. j.
	Vermillion, or	}	lbs. iss.
	Best di-chromate of lead,		

Melt the shellac and turpentine together, and stir in the pigment as the mixture cools."

"SUCCI EXPRESSI. *Expressed juices. Preserved juices.*

Under this name a class of preparations have been introduced into this country [England] by Mr. Squire. They are made by expressing the juices from plants, at the period of their growth when they possess the greatest amount of medicinal activity; mixing these juices with half their volume of rectified spirit, allowing the mixture to stand for a short time and then filtering. In this manner the following are made:—Preserved juices of *wormwood*, *aconite*, *conium*, *digitalis*, *hyoscyamus*, *lettuce*, *dandelion*, &c.

Interspersed with the more valuable formulæ from which the above have been selected, are many curious specimens in the way of recipes, among which may be found directions for preparing gingerbread, mint juleps, sherry cobblers, milk punch, boot blacking, horse medicines, bread, artificial gems, candies, artificial mineral waters, and perfumed waters. With the latter is the following curious account of the old Hungary water.

"AQUA HUNGARICA. *Hungary water.*

The following is the formula preserved in the Imperial Library at Vienna, said to be in the hand-writing of Elizabeth, Queen of Hungary, (or Langravine of Thuringia,) 1235.

'I, Elizabeth, Queen of Hungary, being very infirm and much troubled with the gout in the seventy-second year of my age, used for a year this receipt, given by an ancient

hermit, whom I never saw before nor since; and was not only cured, but recovered my strength, and appeared to all so remarkably beautiful that the King of Poland asked me in marriage, he being a widower and I a widow. I, however, refused him for the love of my Lord Jesus Christ, from one of whose angels I believe I received the remedy. The recipe is as follows:—R. Aqua vitæ four times distilled, three parts; and the tops of flowers of rosemary two parts. Put these in a close vessel and let them stand fifty hours in a gentle heat, and then distil them. Take ℥j. of this in the morning once every week, and let your face and diseased limb be washed with it every morning.’”

P.

ART. VI.—ACCOUNT OF A NEW ANÆSTHETIC AGENT, AS A SUBSTITUTE FOR SULPHURIC ETHER IN SURGERY AND MIDWIFERY. By J. Y. SIMPSON, M. D., F. R. S. E., Professor of Midwifery in the University of Edinburgh, Physician-Accoucher to the Queen in Scotland, &c. 8vo. pp. 21. Edinburgh: 1847.

WE gather from this pamphlet that its author, Dr. Simpson, on the 10th November, 1847, communicated to the Medico-Chirurgical Society of Edinburgh, the substance of the present publication, the title of which is given above.

After experimenting with various articles for the purpose of discovering a substitute for sulphuric ether, Mr. Waldie suggested that the perchloride of formyle was worthy of a trial.

Chloroform, or perchloride of formyle, after having tried

it in about fifty cases, Dr. Simpson thinks is far superior to sulphuric ether as an anæsthetic agent. Three cases of surgical operations performed under the influence of chloroform are detailed.

The advantages of chloroform over sulphuric ether, Dr. Simpson alleges, are:

1. A much less quantity is required; from a hundred to one hundred and twenty drops of chloroform being sufficient to render the patient insensible to pain.

2. Its action is more persistent, and is more promptly induced; from ten to twenty inspirations being sufficient.

3. Those who have inhaled both, declare that the inhalation of chloroform is more agreeable than that of sulphuric ether.

4. Chloroform is cheaper than sulphuric ether.

5. Its odour is agreeable, and does not long adhere to the clothes like that of sulphuric ether; and it is more portable than the ether because a smaller quantity is required.

6. It is exhibited without an apparatus, being dropped simply into a hollow sponge, or into a handkerchief, after giving it a cup-like form, and the sponge or handkerchief is then applied to the mouth and nose gradually.

7. Nothing unpleasant has resulted from the trials thus far made with chloroform.

“The preparation which I have employed was made according to the following formula of Dumas:—

R Chloride of lime in powder, - lbs. iv.

Water, - - - - - lbs. xii.

Rectified spirit, - - - - f. $\frac{3}{4}$ xii.

Mix in a capacious retort or still, and distil as long as a dense liquid, which sinks in the water with which it comes over, is produced.” (Gray’s *Supplement to the Pharmacopæia*, 1846, p. 633.)

“The *perchloride of formyle*, $\text{Fo. Cl}_3 = \text{C}_2 \text{H, Cl}_3$ is also produced from a compound of the ethyle series, namely,

from chloral, by the action of alkalies. It is an oily liquid of a sweet taste and ethereal smell. When acted on by alkalies, it yields chlorides and formiates." (Gregory—*Outlines of Organic Chemistry*, p. 401.)

The chemical constitutions of the three articles, which, by inhalation, induce insensibility, are remarkable, because of their wide difference; namely,

Nitrous Oxide, = N. O.

Sulphuric ether, = $C_4 H_5 O$

Chloroform, $C_2 H. Cl_3$

Since Dr. Simpson's pamphlet was published, several experiments have been made in England, confirming the opinion expressed by the author.

NOTE.—Chloroform was first discovered by Mr. Gurthrie, of Sackett's Harbor, N. Y., and afterwards by Soubeiran. See a paper by Daniel B. Smith, of this city, in Vol. iv., p. 114, of this Journal.

R.

ART. VII.—ON THE PURIFICATION OF SULPHURIC ACID, AND THE DISTILLATION OF LIQUIDS IN GENERAL.

By M. LEMBERT.

SULPHURIC acid is, of all the re-agents, the most frequently employed in the laboratory, and yet it is but seldom found in a state of purity. This arises from the difficulty and even danger that attends its purification, especially if a large quantity be operated on. As met with in commerce, it is generally very impure, and it is difficult to distil a few pounds, or even a smaller quantity of it, without the retort being broken by the bumping which arises from the vapour being formed with less facility in vessels having a smooth surface, from the density and consistence of the liquid, or from the high temperature at which it enters into ebullition, as well as from the liquid being a bad conductor of heat.

It has been proposed to introduce into the retort, pieces of glass, strips of platinum, &c. Some have recommended to apply the heat only to the upper part of the liquid, but these methods I find by experience do not accomplish the object desired. I have endeavoured to discover some plan capable of facilitating the formation and the disengagement of the vapour, and the following I find to succeed the best :

1. I introduce into the retort some pieces of *Quarzite*, a variety of granulated quartz, resulting from the conglomeration of particles of that substance, probably under the influence of a high temperature. It is important to choose this variety, the others giving far less satisfactory results. The shape of the pieces is by no means a matter of indifference, with reference to the success of the process. I have remarked in a great number of distillations, that the fragments obtained by striking on the edge of a former cleavage, facilitates the distillation better than very thick pieces. The number as well as the size of the pieces, must also be observed. If they are too small, and in too small a quantity, the bumping may occur, because the fragments are easily lifted by the vapour which is disengaged, consequently, the bottom of the retort being no longer covered with the siliceous substance, assumes the condition of a smooth vessel, and the vapour is produced with difficulty. If they be small, and in too great quantity, the ebullition is irregular, bumping occurs without ebullition, bursts of vapour take place at intervals, the liquid rises in the retort, and if the latter be rather full, it may pass over into the neck. The fragments should be at least a *centimetre* (one-third of an inch) in length, for the operation to succeed well. I use them generally as large as the neck of the retort will allow. Ten or twelve scales of *quarzite* of this size are sufficient to distil readily several pounds of acid. It is well to cover the retort, that is to say, to distil in a reverberatory

furnace, furnished with a dome; without this precaution, the distillation would proceed very slowly, although the ebullition might be very brisk, because the vapour of sulphuric acid being very heavy, and only existing at a high temperature, would condense before reaching the neck of the retort.

This process, which is very simple, is especially advantageous, since it may be applied to the distillation of many other liquids. In fact, the substance employed to facilitate the ebullition, is unalterable by nearly all chemical agents, and for the last three of four years, since I have discovered it, I have employed it in nearly all my distillations.

2. In the process just described, the quartzite acts by its numerous rough surfaces in facilitating the formation of the vapour; but theory shows that the same result might be obtained, that is, the distillation without bumping, if the acid could be made a good, or at least a better conductor of heat; and this point I think may be thus arrived at:—

Sulphate of potash, and dry sulphate of soda dissolve readily in sulphuric acid, especially when aided by a gentle heat. This solution appears to conduct heat very well, and boils without bumping, provided there be not too great a quantity of sulphuric acid in proportion to the sulphate. I proceed thus:—I put into a retort the sulphuric acid which I wish to distil, and add to it from 150 to 200 grammes of sulphate of potash or soda for every killogramme of acid (from two to three ounces to the pound avoirdupois) and then distil as already stated. I collect two-thirds or three-fourths at most of the acid, and if I wish more, I add fresh acid, and recommence the distillation. When the process is terminated, I allow the retort to cool, and stop it up to be kept for subsequent use. I have said that I do not collect more than three-fourths of the acid originally put into the retort, and for these reasons:—In the first place, the mixture boils at a higher temperature than the boiling point of sul-

phuric acid, and the temperature arises in proportion as the solution becomes more concentrated. If it be concentrated too much, that is, if too much acid be distilled off, there would soon remain little more than the bisulphate, and, under these circumstances, the glass would be softened. The softening of the glass occurs even at an earlier stage of the process than this. In the second place, this solution of sulphate, or rather of bisulphate of potash in sulphuric acid, becomes less fusible in proportion as it contains less acid, and when the retort is to be again used, the risk of breaking it is incurred in effecting the fusion of the solid mass.

3. Of these two processes, I prefer the first; and although it may be sufficiently efficacious, since those to whom I have shown it, and who have practised it, have been astonished at the facility with which the acid distils by this method, yet the process may be rendered more easy still by combining the two, that is to say, by putting into the cucurbit, both the sulphate and the *quartzite*. Then, except the elevation of temperature, the sulphuric acid boils as easily, and with as much regularity, as water.

It is well not to distil the sulphuric acid too many times on the same *quartzite*, for the rough edges are blunted, a very fine powder is separated, which floats in the liquid, and after the lapse of a certain time, it no longer produces the same effect. Then, if the latter method be adopted, we must not wait until the residue of the distillation is quite cold before adding fresh acid, because the pieces of *quartzite* which would remain in the solid mass could not be changed. To effect this, it is necessary to add the acid before the refrigeration is complete, to decant the liquid, take out the *quartzite*, and return the solution into the retort, in readiness for another operation, after having added to it some fresh pieces of the substance mentioned. The retort also should not be too full, and should be placed, if possible, in such a

position, that the first part of the neck may incline towards the body of the retort.

The reason of this, which is an observation applicable to the distillation of liquids generally, is, that when a liquid is in a state of ebullition, if it be looked at horizontally at the level of the surface, small drops are sometimes seen projected above the surface, forming curves of greater or less extension. All liquids, in boiling, do not exhibit this phenomenon; but as sulphuric acid does, it follows, consequently, that during the operation, and especially if the retort be too full, a great number of these drops are thrown into that part of the neck which is near the body of the cucurbit. This part of the neck should, therefore, be inclined in such a manner, as to favour the return of these drops into the cucurbit, which, without this precaution, would run over, and mixing with the distilled liquid, render it impure. Currents of cold air, also, cannot be too much guarded against, which otherwise striking against the neck of the retort, would be likely to cause a fracture. Every time that my retorts have been broken in distilling sulphuric acid, the accident has happened in this way.—*Pharm. Journ., from Journ. de Pharm.*

ART. VIII.—ON QUINOIDINE.

BY DR. F. L. WINCKLER.

IN the year 1843, the author discovered that commercial quinoidine contained, besides more or less cinchonia and quinia, also a very large proportion of an alkaloid which was apparently in combination with two different coloured, amorphous, resinous substances. This alkaloid was amorphous, and yielded only amorphous salts; but in other respects it did not differ from quinia, and had exactly the same combining weight as the latter. The author therefore recommended it to be purified and employed as amorphous quinia in the same way as common quinia. He is, however, of opinion, that Liebig (who has recently proved by ultimate analysis, that these two bodies have the same composition) overvalues the importance of quinoidine. Dr. Winckler obtained from eight ounces of crude quinoidine, only three ounces of pure, white, amorphous quinine, so that no great pecuniary advantage can be derived from it; whilst, on the other hand, the crude, and certainly cheap quinoidine should not be employed, on account of its variable composition, and its liability to adulteration.

Crude quinoidine having such a variable composition, cannot always be obtained pure in the usual way, by dissolving it in alcohol, ether, acids, &c.; the author tried, therefore, to destroy the foreign substances contained in it, by sulphuric acid of sp. gr. 1.83—1.84, since the latter affects neither the amorphous nor the crystallizable quinia, nor cinchonia. Finely-powdered crude quinoidine was mixed in small quantities with an equal weight of sulphuric acid, so that each portion was separately dissolved before the other was added, an operation not easily performed, since the powder conglomerates almost always, as soon as

it is thrown into the acid. After the lapse of twenty-four or thirty-six hours, the mixture is copiously diluted with water, and the deep greyish-brown substance which separates during this process, is filtered off. The latter, well washed, forms, if dry, a loose, amorphous, almost black, not bitter mass (four ounces of the best crude quinoidine, gave two drachms of it.) To the filtered liquid (which is clear, dark blue or brown, of an acid, and afterwards bitter taste,) whilst boiling, crystallized carbonate of soda is added, until a whitish precipitate forms—a dark brown resinous mass having already separated on the liquid having been saturated with the carbonate of soda. The white precipitate being formed, as much crystallized sulphate of soda is added, as of carbonate of soda used. The mixture is frequently stirred, boiled in the water-bath for about a quarter of an hour, and then allowed to cool. After some time, the thin film of pale yellow, transparent, resinous compound covering the surface having been removed, a somewhat hard, resinous, bitter, almost black substance, often covered with some cinchonia, is found at the bottom of the vessel. The compound which covered the liquid is quinoidine, in a purer state; it is to be placed in the vessel intended to receive the filtered solution, whilst the filtrate is mixed with the required quantity of carbonate of soda for the effectual separation of the alkaloid. The almost white precipitate which had formed, dries up, in a few minutes, to a resinous mass, and is now repeatedly washed with hot distilled water. A considerable proportion of quinoidine remains, however, still in the precipitated resinous substance; the same is, therefore, pulverized, and for some time digested with diluted acetic acid of about five per cent., till nothing more dissolves. The filtrate is mixed with sulphate of soda, by which a considerable quantity of an almost black resin separates, which adheres to the sides of the vessel. The filtered fluid which is of a wine-yellow

colour, yields upon the addition of carbonate of soda, the quinoidine, which is likewise to be washed with hot water, and dried in the water bath, together with that obtained before. The quinoidine thus obtained forms a yellowish white powder, which becomes electrical by friction, and dissolves perfectly in acid, spirit of wine, and also in ether, in which latter, a brown, resinous, bitter substance is precipitated. Four ounces of the best quinoidine furnished thirty drachms of purified quinoidine, whilst very inferior sorts only contained a very small quantity of the same. If quinoidine, as it is obtained in commerce, be dissolved in diluted sulphuric acid (1 part to 3—5 parts of water) purified quinoidine is also obtained by the foregoing method, but the separation of the brown, resinous combination takes place imperfectly, consequently the product is less pure. Still the diluted acid is well adapted for purifying inferior sorts of quinoidine from foreign admixtures, which cannot be dissolved by acids.

Experiments were now made to purify quinoidine, by ether. Eight ounces of a very excellent sort of quinoidine obtained from yellow cinchona (*cinchonia regia*) were mixed with twenty-four ounces of pure ether. The powder immediately conglomerated into a resinous mass, whilst the ether assumed a yellow colour, like gold. The ethereal solution having been poured off after a few days' digestion, was treated with animal charcoal and evaporated: four ounces of a pale-yellow, resinous, very bitter residue was obtained. This was converted by the necessary quantity of very diluted pure sulphuric acid into a neutral salt, and the solution evaporated by a gentle heat. Very soon a rather large quantity of pure sulphate of quinia crystallized out of it. This having been removed, no more crystals formed, even by further concentration. The solution was, therefore, again diluted, treated with purified animal charcoal, and the filtrate mixed with the necessary quantity of ammonia for precipitating the amorphous quinia contained

in it. The latter separated in the form of a beautiful white precipitate, which, however, soon conglomerated again. It was now washed with distilled water, dried in the water-bath and then pulverised; the powder weighed twenty-eight drachms, and consisted of very pure amorphous quinia. As that part of the amorphous quinia which had not been dissolved by the ether still tasted very bitter, twenty-four ounces of common ether were again added. This acquired a brownish-yellow colour, whilst the undissolved parts changed into a dark-brown liquid of the consistency of treacle. The ethereal solution deposited after some days a considerable quantity of a crystalline mass, and left, by evaporation, about ten drachms of a light yellowish-brown, amorphous, resinous, bitter substance, which, being treated with pure ether, separated into almost colourless amorphous quinia, a considerable quantity of coloured cinchonia, and a deep yellowish-brown, resinous, very bitter compound. When the latter was treated, according to the above-mentioned method, with an equal weight of sulphuric acid, a large quantity of pure amorphous quinia was obtained from it. That part which had remained undissolved, after having been treated with common ether, was dried in the water-bath, triturated, and mixed with diluted acetic acid. By this it was almost all dissolved. On the addition of Glauber salt, however, a rather large quantity of a dark-brown substance precipitated from the liquid, which, after being dried, possessed scarcely any bitter taste, and had a greyish-brown colour. The filtered acetic solution yielded upon the addition of liquid ammonia, a very deep-coloured quinoidine, which gave scarcely any trace of amorphous quinia to ether. The compound which had spontaneously crystallized out of the solution prepared with common ether, was dissolved in spirit of wine of eighty per cent., and the solution after being discoloured by animal charcoal, was filtered whilst boiling hot. On

cooling, a large quantity of cinchonia separated in crystals, and also on further evaporation. At last, a small quantity of alkaloid crystallized in the form of fine white prisms. Its nature was the same as the alkaloid before mentioned by the author under the name of *Quinidin*. The cinchonia thus obtained amounted to three drachms, the quinidin to forty grains. Out of the last proportions of the mother liquor there was also obtained by evaporation, a light-brown amorphous mass, from which a small quantity of amorphous quinia could be extracted by concentrated sulphuric acid.

Although it cannot be denied that good quinoidine contains very much alkaloid, there is still even in the best qualities, no part of the quinia free. It is always combined with a resinous substance. The amorphous quinia is further accompanied by a light-yellow compound, which adheres obstinately to it, and renders the purification very difficult. The brown compound appears to be some red cinchonic, changed by the action of the lime; the yellow compound, however, seems to be a peculiar constituent of the bark. Of ten sorts of saleable quinoidine examined by the author, only three contained a comparatively large proportion of amorphous quinia, five contained but little alkaloid, and two only traces of it; and it is in consequence of this varying composition of the crude quinoidine, that it cannot be recommended for medicinal use. It will, however, be advantageous to free crude quinoidine by diluted sulphuric acid (one part acid of 1.38 specific weight, and two parts water) and by pure ether from the foreign admixture, so that it might represent a preparation of equal chemical composition. If ether containing water and alcohol be employed, a quinoidine of a very different composition is obtained, and even if pure ether be used, it will depend on the chemical composition of the crude quinoidine whether the result will be a pure amorphous quinia, almost

pure white, yellowish, or yellow like gold. In the latter case, part of the colouring matter, might be removed by the formation of the neutral sulphate, and by treating it with purified animal charcoal. This, however, cannot be done without considerable loss. This colouring matter probably does not much influence the effect of the preparation. The yellow amorphous quinia becomes still brown on the addition of concentrated sulphuric acid, and after some time, if water be added, some brown flakes are precipitated. If yellow amorphous quinia be dissolved in muriatic acid, and an excess of chloride of platinum added, a pure, double quinia salt is formed; but if the filtrate be mixed with sal ammoniac and the solution evaporated in the water-bath to dryness, a yellow salt remains as residue, which contains, besides the platinum-chloride of ammonium, a golden-yellow, not bitter, substance, which is insoluble in ether, but is soluble in anhydrous alcohol, and may thus be isolated.—*Pharm. Journ. from Pharm. Central Blatt.*

ART. IX.—ON BLISTERING CLOTH.

BY M. GAROSTE.

- R.** Black pitch, purified, 125 parts,
White wax, 30 parts,
Cantharides in fine powder, 60 parts,
Essence of turpentine, 15 parts,
Olive oil, 8 parts.

The pitch is purified by melting it in a dish, and strain it through a close piece of linen.

The pitch, thus purified, is melted in an earthen vessel over a gentle fire, with the wax ; the cantharides, the oil, and the essence of turpentine are then added ; when the mixture is well stirred, a small quantity of the plaster is thrown into cold water and kneaded : if it be neither too soft nor too brittle, it is then spread on the glazed side of some oil-cloth with a plaster-iron slightly heated.

The quantity of wax, oil, and essence, may be varied according to the quality of black pitch employed, so as to give the plaster a consistence suitable for its being spread on cloth. Copper vessels should never be used for preparing those medicinal compounds of which wax is an ingredient ; the plaster should be melted in a glazed earthen vessel. The cantharides are added by means of a sieve, so as to divide the particles, and prevent their collecting into lumps. It is convenient in sending out the blistering-cloth, to cut a piece of oiled paper of the same size, and lay this over the surface of the plaster, to prevent its adhering to the envelope.

These vesicatories should never be camphorated with a solution of camphorated ether, but rather with camphor finely pulverized, and for this purpose the blistering-cloth should previously be slightly warmed.

Of all the formulæ published for blistering-plaster, there are none, in my opinion, more easy in application, and that will keep in a better state of preservation than this.—

Pharm. Journ. from Journ. de Pharm.

ART. X.—ON THE MANUFACTURE OF THE PROTOCHLORIDE OF TIN.

BY CHARLES NÖLLNER.

WHEN a long flask is filled to the top with granulated tin, and a concentrated solution of protochloride of tin is then poured into it, and kept constantly boiling, large bubbles of muriatic gas incessantly escape from the solution, which gradually dissolve the tin above the liquid; and in proportion as this happens, an amorphous crust of tin separates from the tin-solution on the surface of the liquid; so that if the boiling were continued for fourteen days, as much of the tin situated above the liquid would be dissolved as the solution previously contained. No hydrogen gas is evolved; it is merely a continuous separation and reunion of the elements of the tin-salt, the electro-negative constituents of the solution, *i. e.*, the muriatic acid and the oxygen of the water combine with the tin situated above the liquid, which is there positive, and dissolve it; while the protoxide of tin and the hydrogen of the decomposed water, the positive constituents of the solution, proceed beneath the surface of the liquid to the tin, which is there negative, the hydrogen reducing the protoxide of tin, and thus eliminating tin in the form of a bright metallic layer.

If this process is carried out in the cold by placing a bar of tin in a concentrated solution of the protochloride, and carefully pouring a layer of water upon this, so that the bar of tin is situated in both liquids, we very soon observe at the place where the two liquids are in contact, the tin separate in spicula, frequently from four to five inches long. Sometimes it is also obtained in very thin quadratic laminæ, which readily separate at their centre into four rectangular

triangles, and which upon closer examination under the microscope are formed exactly like those scalariform pyramids, composed of innumerable cubes, of chloride of potassium, chloride of sodium, &c.; the spicula above-mentioned are likewise scalariform pyramids, elongated in one direction, and upon which numerous minute, very regularly formed cubes usually occur. When the separation takes place more slowly from less concentrated liquids, and especially when large quantities are operated upon, very regular four-sided columns are obtained. When, on the contrary, a solution of tin is made to support a stratum of dilute muriatic acid, or a mixture of muriatic acid and solution of tin, a stratum of water or concentrated muriatic acid and water, and a bar of tin is carefully inserted, crystals are immediately formed, but which, on account of the rapidity of their formation, resemble more closely the flowers of chloride of ammonium; just as sal-ammoniac separates on slow crystallization in cubes, but when quickly evaporated produces the well-known arborescent figures.

Above and beneath the spot where the crystals of tin separate, a thin black layer is formed, consisting of finely-divided copper with some tin when commercial tin is used, which always contains copper and some iron; when several such bars are connected, after the manner of Zamboni's battery, in adjacent glasses containing strata of tin solution and water, crystals are formed in each of the glasses; but the black deposit appears at first always in one direction, being on one side of the bar of tin above, and upon the other side below the limit where the two liquids touch; but after a time this sediment is formed both in the water and in the tin solution of each glass.

Copper resembles tin in its behaviour, but it requires from eight to fourteen days to obtain regular octahedrons.

When this electrical process is applied to the preparation of the protochloride of tin on a large scale, the ordinary

plan is entirely reversed. The tin is not dissolved in dilute muriatic acid, and the saturation effected by repeatedly pouring the ley over granulated tin; but earthenware recipients, filled with granulated tin, are adapted to the retorts from which the muriatic acid is disengaged, by which a highly concentrated solution is obtained, with the advantage, moreover, that the muriatic acid is instantly absorbed by the tin; thus avoiding all loss of muriatic acid and its destructive effects upon the building and vegetation. Nor are the workmen at all inconvenienced by the vapours. The concentrated solution of tin is now evaporated, not in earthenware or copper vessels, but in a tin pan, which is easily constructed; and the evaporation must always be conducted as in a copper pan with a large excess of granulated tin; for even though the solution contain free muriatic acid, the granulated tin and not the pan is acted upon, the tin of the pan becoming electro-negative, while the granulated tin in the pan becomes electro-positive. All the copper contained in the liquid is deposited upon the granulated tin as a black powder, while pure tin, in bright metallic layers, is deposited upon the tin pan itself at the surface of the evaporating solution; so that if such a tin pan, after daily use for several years, should be worn into a hole, it may easily be mended by stopping it first with a tin nail, and keeping the surface of the evaporating tin solution for a length of time at that spot, when it is gradually stopped, being as it were soldered in the *moist way*.—*Chem. Gaz. from Liebig's Annalen.*

ART. XI.—METHOD OF DETECTING THE ADULTERATION
OF CANE-SUGAR WITH STARCH-SUGAR, AND THE
SYRUP OF THE FORMER WITH THAT OF THE LATTER.

BY DR. G. REICH.

WHEN a boiling saturated solution of bichromate of potash is added to a thick syrup of cane-sugar and the mixture heated to boiling, the chromic acid is reduced with a violent reaction, which continues even after removing the vessel from the fire, and the liquid is coloured green by the oxide of chromium in solution. When starch-sugar syrup is treated in the same manner, a very different behaviour is observed, and which may be employed to distinguish these two kinds of sugar; the starch-molasses has not the least action on the bichromate of potash; and when mixed with cane-sugar molasses to the amount of $\frac{1}{3}$ — $\frac{1}{2}$, prevents the reaction of the latter; the mixture merely froths somewhat more when heated, but does not change its colour. When the amount of starch-sugar molasses is smaller, a slight alteration of colour is perceptible; but it is never so decided as with cane-sugar syrup alone. While these syrups may be thus distinguished, the sugars themselves cannot be determined in this manner, because the bichromate of potash is wholly without action upon the concentrated solutions of both, but they may be distinguished by nitrate of cobalt. When some potash is added to a concentrated solution of pure cane-sugar, and the mixture heated to boiling, a violet-blue precipitate falls, even when the solution is diluted, on the addition of a few drops of nitrate of cobalt. The dilute solution of the starch-sugar, treated in the same manner, is not precipitated; and the concentrated

44 DETECTION OF THE ADULTERATION OF CANE SUGAR.

solution of the same sugar, to which potash has been added, deposits a dirty brown precipitate. A small amount of starch-sugar in the cane-sugar prevents the formation of the violet-blue precipitate with nitrate of cobalt. The above experiments of Reich have been repeated and confirmed by Herzog, who observes that the syrup of beet-root sugar acts as violently on the bichromate of potash as the syrup of cane-sugar; the liquid, however, does not become green, but retains its colour like the syrup of starch-sugar. A mixture of cane-sugar syrup and the syrup of beet-root sugar must however contain far more of the latter for the green colouring produced by the cane-sugar not to appear. Herzog likewise examined the method proposed by Reich to distinguish grape-sugar and cane-sugar with nitrate of cobalt, and likewise recommends it. Beet-root sugar and mannite afford, according to Herzog, when mixed with potash, the same precipitate with solution of cobalt as cane-sugar. Milk-sugar prevents the precipitation of the nitrate of cobalt by potash, like grape-sugar. Herzog at the same time asserts that mannite, when boiled with sulphate of copper and potash, immediately reduces the oxide of copper, which is not the case according to Dr. Knop when the mannite is pure and perfectly free from grape-sugar.—*Chem. Gaz. from Archiv. der Pharm.*

ART. XII.—RESEARCHES ON GENTIANINE.

BY DR. BAUMERT .

GENTIANINE was first considered to be the bitter and medicinal principle of the gentian root; and subsequently, after it had been prepared by Tromsdorff pure and free from the bitter principle of the root, it was looked upon as a colouring substance, and called by Lecomte *genticine*. The following investigation makes us acquainted with the composition and chemical nature of this body. To prepare it, the gentian root was first freed from a portion of the bitter extract by exhaustion with cold water, then dried again and extracted with alcohol. On removing this by distillation, a brown resinous mass, of an excessively bitter taste and acid reaction, remains. On pouring water over it, light brown flakes separate, while the bitter principle, the acid, sugar, &c., dissolve in the water. The precipitate thrown down by water from the syrupy residue is purified as much as possible from the bitter substance by washing; it then contains gentianine, a caoutchouc-like substance, fat, and still some of the bitter principle. The fat is removed by treatment with æther, and the residue again dissolved in strong alcohol, which upon evaporation leaves a crystalline mass still possessing a bitter taste and containing an admixture of resin. The gentianine is at last obtained pure by frequent recrystallization in light yellow acicular crystals; but this mode of preparation is connected with considerable loss, as the gentianine is somewhat soluble in water, and still more so in æther. Only 1 dr. of gentianine was obtained from 20 lbs. of the root; but even this amount was greater than that obtained according to the process advised by Lecomte, which is based upon the fact that the

gentianine is not precipitated by the neutral acetate, but only by the basic acetate of lead, so that a great portion of the impurities can be removed by a solution of the first salt.

Gentianine crystallizes in slender, pale yellow, tasteless needles. It is very sparingly soluble in water; 1 part requires 3630 parts water; it dissolves best in boiling alcohol; it dissolves in alkaline water, imparting to it an intense yellow colour; it is permanent in the air, and may be heated to 392° without loss of water; it sublimes between 572° and 644° , disengaging yellow vapours, which condense into fine needles, while the greater portion is carbonized with evolution of a peculiar odour. Gentianine has the following composition:

Carbon,	65.05	65.09	65.04	14=1050.0	65.11
Hydrogen,	4.15	4.24	4.10	5	62.5
Oxygen,	30.80	30.67	30.86	5	500.0

1612.5

Gentianine has no reaction upon the vegetable colours; it is a neutral or indifferent body, which combines with acids and bases without parting with the elements of water. It expels carbonic acid from the carbonated alkalies, but the carbonic acid of the atmosphere likewise decomposes several of its combinations if they are still moist.—*Chem. Gaz.*

ART. XIII.—ON THE ACETOUS FERMENTATION OF SOME OF THE ALCOHOLIC PREPARATIONS OF THE PHARMACOPŒIA.

BY MR. WILLIAM BASTICK.

IN all the works on *Materia Medica* and *Pharmacy* which I have examined, where the subject is alluded to at all, it is stated that the tinctures of the *Pharmacopœia* are very stable preparations, and that the only deterioration which takes place in them is that caused by the evaporation of the spirit, producing, in consequence, either a more concentrated tincture, or precipitating a portion of the materials held in solution. That the above statement falls far short of the real facts is well known by all *Pharmaceutists*, from the circumstance that most of the tinctures made with proof spirit undergo a gradual change, which ultimately ends in rendering them comparatively inert and worthless.

With a view to ascertain what was the general nature of the change to which these alcoholic preparations were liable, portions of various ones were kept many months in the ordinary circumstances in which they would be placed by their consumption in a *Druggists' shop*, such as being in bottles half-filled in a temperature varying from 60 to 80 degrees of *Fahrenheit*, and occasionally admitting fresh air.

After a lapse of time, most of them, on examination by the proper tests, were found to have undergone the acetous fermentation in a greater or lesser degree—the alcohol having been gradually converted into acetic acid. The tinctures were generally diminished in colour and taste, and contained a precipitate, a portion of which was re-

soluble on the addition of a sufficient quantity of spirit to supply the place of that decomposed. This circumstance shows that a part of the precipitate was caused by the decomposition of the alcohol, and a part by the destruction of the vegetable principles themselves. When the tinctures in this condition were completely exposed to the action of the atmosphere at a sufficient temperature, the alcohol contained in them was speedily and entirely converted into acetic acid.

The proof-spirit tinctures most liable to the acetous fermentation are those which contain those proximate principles in solution which are prone, *per se*, to decay, the spirituous menstruum not having sufficient antiseptic power to permanently resist their decomposition. The tinctures made with rectified spirit are not susceptible of any change of a similar character, neither are the tinctures above spoken of, when the strength of the spirit is considerably increased, arising from the insolubility of some of the proximate principles prone to decay in the stronger spirit, as well as its antiseptic quality.

That the acetous fermentation is induced in the tinctures by the presence of bodies in a state of change, acting as a ferment, is clear from the fact that a mixture of alcohol and water will not ferment without the presence of some such body. It is also evident that the vegetable substances held originally in solution have been subject to a material change by the loss of colour and taste of the tincture, and by it containing a precipitate, a portion of which was insoluble in a mixture of alcohol and water.

Some of the preparations most prone to this change are the tinctures of senna, rhubarb, columba, henbane, digitalis, bark, hops, aloes, compound tincture of cinnamon, compound decoction of aloes, concentrated infusions, fluid extracts, and all similar preparations, especially those which are weaker in spirit than the tinctures. Many complaints

have been made by Pharmacutists, of the proneness to decomposition of the compound decoction of aloes, and they have suggested remedies for its prevention; but none have pointed out the general nature of the process of decay, which differs somewhat from the tinctures from carbonate of potash being used in its fabrication.

If the decoction is examined when first prepared, after having been sufficiently boiled, it will be found that the carbonate of potash has been decomposed by the resinous acids of the myrrh and aloes. On the addition of acetic acid no carbonic acid will be evolved, but the resinous matter which is in combination with the potash, forming compounds analogous to the soaps, will be precipitated, and may be re-dissolved by more of the alkali or alcohol. When the acetous fermentation has sufficiently advanced in the decoction, the alkali will be found in combination with acetic acid, which acid has precipitated the resinous acids from the base. Crystals of acetate of potash may be obtained by evaporating the clear portion of the decoction. The resinous matter may be separated from the precipitate by the action of a solution of carbonate of potash.

From the above statement may be gathered answers to the questions which have been so often asked, as to whether compound decoction of aloes ought to be clear or opaque, and in what condition it is proper to use it. Compound decoction of aloes, fluid extracts, and all other analogous aqueous solutions of vegetable substances, when the spirit is added which is used to preserve them, will precipitate a portion of the proximate principles held in solution, because they are less soluble, or quite insoluble in such a mixture of water and alcohol. This precipitation does not frequently occur at once, from the circumstance that the spirit is added to the solution before it is cooled down to that temperature at which the principles become insoluble in the mixture. It is therefore prudent not to add the spirit

until the preparation has acquired that temperature to which it is exposed in the course of consumption. Should a precipitation occur after these precautions have been adopted, it may be taken as a tolerably clear evidence that the preparation is decomposing; consequently it is manifest that when the decoction is in this condition, neither the clear portion, nor the clear and thick together, should be used for the purposes of that ordered by the Pharmacopœia, as the whole must necessarily be changed in its properties. As we are expressly forbidden to alter the constitution of any of the preparations of the Pharmacopœia, any suggestions to remedy the evils complained of by such means are futile. There is but one course open to us, viz., to inquire under what conditions can these preparations be kept most powerful to resist their tendency to decomposition? The answer will be, that as far as circumstances will permit to keep the preparations in bottles, filled and well closed, and in a low temperature, which are the conditions found to be least favourable to the development of the acetous fermentation.—*Pharm. Journ.*

ART. XIV.—CHLOROFORM AN ANÆSTHETIC AGENT AS A
SUBSTITUTE FOR SULPHURIC ETHER.

Dr. Simpson gives the following account of the chemical constitution of Chloroform :

“Formyle is the hypothetical radical of formic acid. In the red ant (*Formica rufa*) formic acid was first discovered, and hence its name. Gehlen pointed it out as a peculiar acid; and it was afterwards first artificially pre-

pared by Doebereiner. Chemists have now devised a variety of processes, by which formic acid may be obtained from starch, sugar, and, indeed, most other vegetable substances.

A series of chlorides of formyle are produced when chlorine and the hypochlorites are brought to act on the chloride, oxide, and hydrated oxide of methyle (pyroxylic or wood spirit.) In the same way as formic acid may be artificially procured from substances which do not contain formyle ready formed,—so also are the chlorides of this radical capable of being procured from substances which do not originally contain it.

Chloroform, chloroformyle, or the perchloride of formyle, may be made and obtained artificially by various processes,—as by making milk of lime, or an aqueous solution of caustic alkali act upon chloral,—by distilling alcohol, pyroxylic spirit, or acetone, with chloride of lime,—by leading a stream of chlorine gas into a solution of caustic potass in spirit of wine, &c. The preparation which I have employed was made according to the following formula of Dumas:—

‘B	Chloride of lime in powder, -	lbs. iv.
	Water, - - - - -	lbs. xii.
	Rectified spirit, - - - -	f. ℥ xii.

Mix in a capacious retort or still, and distil as long as a dense liquid, which sinks in the water with which it comes over, is produced.’ (Gray’s *Supplement to the Pharmacopœia*, 1846, p. 633.)

The resulting perchloride of formyle consists of two atoms of carbon, one of hydrogen, and three of chlorine. Its specific gravity is much greater than that of water, being as high as 1.480. It boils at 141°. The density of its vapour is 4.2. It is not inflammable, nor changed by distillation with potassium, potash, sulphuric, or other acids.

It is now well ascertained that three compound chemical bodies possess, when inhaled into the lungs, the power of superinducing a state of anæsthesia, or insensibility to pain in surgical operations, &c., namely, nitrous oxide, sulphuric ether, and perchloride of formyle. The following tabular view shows that these agents are entirely different from each other in their chemical constitution, and hence that their elementary composition affords no apparent clue to the explanation of their anæsthetic properties:—

	Propor. of Nitrogen.	Propor. of Oxygen	Propor. of Carbon.	Propor. of Hydrogen.	Propor. of Chlorine.
Nitrous Oxide, } Sulphuric Ether, } Chloroform, }	1 Atom.	1 Atom.	...	...	...
	...	1 Atom.	4 Atoms.	5 Atoms.	...
	...	...	2 Atoms.	1 Atom.	3 Atoms.

It is, perhaps, not unworthy of remark, that when Soubeiran, Liebig, and Dumas engaged, a few years back, in those inquiries and experiments by which the formation and composition of chloroform was first discovered, their sole and only object was the investigation of a point in philosophical chemistry. They laboured for the pure love and extension of knowledge. They had no idea that the substance to which they called the attention of their chemical brethren could or would be turned to any *practical* purpose, or that it possessed any physiological or therapeutic effects upon the animal economy. I mention this to show, that the *cui bono* argument against philosophical investigations, on the ground that there may be at first no apparent practical benefit to be derived from them, has been amply refuted in this, as it has been in many other instances. For I feel assured, that the use of chloroform will soon entirely supersede the use of ether; and, from the facility and rapidity of its exhibition, it will be employed as an anæsthetic agent in many cases, and under many circumstances, in

which ether would never have been had recourse to. Here then we have a substance which, in the first instance, was merely interesting as a matter of scientific curiosity and research, becoming rapidly an object of intense importance, as an agent by which human suffering and agony may be annulled and abolished, under some of the most trying circumstances in which human nature is ever placed."

[In confirmation of the remark that the elementary constitution of the three known anæsthetic agents affords no explanation of the theory of their action, we may mention another circumstance, namely, that while it is currently stated, and we believe on good grounds, that the presence of a very small proportion of alcohol in sulphuric ether occasions so much irritation as to render it improper for inhalation, the chloric ether which consists of chloroform, with above 80 per cent. of alcohol, produces little or no irritation, and was originally preferred to sulphuric ether partly on this account.

As it is likely that chloroform will be extensively used, it is particularly desirable that uniformity in its constitution should be observed. Time and experience will probably bring it to a moderate cost, and insure to the public the advantage of a uniform preparation. We have received a communication from Mr. Morson, and another from Mr. Hooper, each of which contains a caution on this subject, pointing out the importance of distinguishing between chloroform and chloric ether. The great specific gravity of chloroform, and its insolubility in water, are mentioned as characteristic tests, to which we may add, that it is a body very difficult of ignition, which will readily distinguish it from chloric ether.—*Ed. Pharm. Journ.*]

In a paper on the chlorides of hydro carbon, published in 1833, in the 4th vol. of this Journal, its author, Daniel B. Smith, uses the following significant language: "The action of this ether [chloroform] on the living system is interesting, and may hereafter render it an ob-

ject of importance in commerce. Its flavour is delicious, and its intoxicating qualities equal to or surpassing those of alcohol. It is a strong, diffusible stimulant, similar to the hydrated ether, but more grateful to the taste."

Several of our manufacturers now furnish chloroform of good quality, and we shall, ere long, have its powers fairly tested, as a strong interest is felt in reference to it by the medical public.

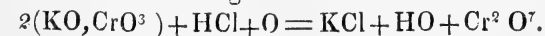
W. P., Jr.

ART. XV.—ON PERCHROMIC ACID.

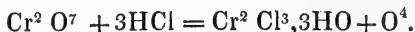
By M. BARRESWILL.

ON mixing a concentrated solution of chromic acid with an equally concentrated solution of peroxide of hydrogen, a violent effervescence is immediately produced by an escape of pure oxygen; when, on the contrary, the solutions are mixed in a very diluted state, the liquid assumes an intense blue colour. This blue colour is of extremely slight stability, and appears to point to the formation of a very readily decomposable higher oxide of chromium than chromic acid; and which, when concentrated solutions are employed, is decomposed immediately on its production. The blue compound may be obtained by mixing a dilute solution of peroxide of barium with an excess of muriatic acid in a dilute solution of bichromate of potash, but it is so unstable that it cannot be isolated from this liquid. It is, however, according to the following experiments, perchromic acid, Cr^2O^7 . To determine the constituents of this body, the author made use of Gay-Lussac and Thenard's apparatus for the analysis of organic substances with chlorate of potash, substituting for the tube a balloon capable of holding half a pint of water.

The balloon was half-filled with impure very acid peroxide of hydrogen, and placed in cold water. A tube connected with the balloon passed with its curved end under a graduated cylinder entirely filled with water. The apparatus so arranged was left for twenty-four hours, during which time not a bubble of gas passed into the cylinder. Upon this an accurately weighed quantity of bichromate of potash, in pieces of a nearly equal size, was conveyed through the cock into the liquid. As these pieces fell into the liquid they were surrounded with blue streaks, and bubbles of gas were disengaged, which passed into the cylinder. When the whole of the bichromate of potash had been added to the liquid, the amount of gas disengaged was read off after two hours' standing, and a second reading made after twenty-four hours; during this interval there was no perceptible increase of gas, although the liquid still contained peroxide of hydrogen. The chromium is no longer contained in the liquid as chromic acid when the evolution of oxygen has ceased, for the acid itself loses a portion of its oxygen during the effervescence, and is left as oxide. 0.5 grm. bichromate of potash disengaged.—I. 152, II. 157, III. 150, IV. 151, V. 150 cubic centimetres of oxygen, that is 1 equiv. of the salt to 4 equivs. of the latter, theory requiring 151 (equiv. of chromium = 310) or 155 (equiv. of chromium = 328.) Now, since the chromium in 1 equiv. of the bichromate of potash, after it has been converted into the blue compound, and this again decomposed, is left behind as oxide, and consequently 1 equiv. of the salt parts with 3 equivs. of its oxygen, we may thence conclude that the peroxide of hydrogen, for every equivalent of the salt, adds 1 equiv. of oxygen to 6 in the chromic acid of the salt, so that the blue body obtains the composition $\text{Cr}^2 \text{O}^7$. The reaction which gives rise to the perchromic acid may be expressed in the following manner :



The decomposition of the perchromic acid in the muriatic liquid is



It was attempted to confirm this reaction by the isolation of the perchromic acid; but all experiments to combine the blue body with an inorganic base failed, and after the experiment was concluded a chromate was constantly found in the liquid. Ether, on the contrary, by being agitated with the aqueous liquid, immediately took up the blue body, the water became colourless, and the supernatant æther blue. But as soon as the æther was removed and evaporated, the water dissolved in it was found to contain chromic acid, as in the preceding experiments, and not oxide of chromium. The author succeeded in combining perchromic acid with vegetable bases. Quinine and strychnine dissolved in æther were precipitated of a dirty violet by the perchromic acid, extracted with æther from the aqueous solution; but the stability of these salts was very slight, and they could only be kept a few hours after their preparation.

Some experiments to procure higher oxides of other metallic acids led, in the case of vanadic acid, to the following result: On treating the vanadate of ammonia in the same manner as the chromate of potash in the preceding experiments, the liquid assumed a blood-red colour, which was more constant; but from the small quantity of material at the author's disposal, the compound could not be further examined.—*Chem. Gaz., from Ann. de Chim. et de Phys.*

ART. XVI.—ON THE PROCESS OF M. ARMAND ROUSSEAU, FOR PRODUCING UPON PORCELAIN A FINE DEAD SILVER, NOT AFFECTED BY SULPHUROUS EXHALATIONS.

By M. ALEXANDER BRONGNIART.

M. ARMAND ROUSSEAU, decorator of porcelain, presented to the Society for the Encouragement of Arts, Paris, specimens of porcelain, the principal decoration of which consists of wavy lines, having the appearance of dead silver. This dead silver, which is of a fine white colour, being relieved by ornaments of blue or any other lively colour, produces a very good effect, and presents the appearance at first sight of white mother-of-pearl, or that which reflects no prismatic colours.

This application of silver on porcelain was well known before M. Rousseau's process; but the results were in general imperfect, being less pure, and possessing less metal than the specimens submitted to the Society. The dead silver prepared and applied by M. Rousseau admits of a very fine burnish being applied, the ground presenting the appearance of white pearl, which sets off to great advantage the ornaments painted thereon. The new process possesses, however, another advantage, of much greater importance than the above-mentioned improvements. It is well known, that by the action of air, charged with the most minute portion of sulphurous particles, silver loses, first its lustre, then its metallic appearance, and finally assumes a leaden appearance, approaching to black; this serious defect has caused the use of metallic silver to be rejected by all manufacturers who wish their porcelain to be ornamented in a durable and brilliant manner. The lustre may be renewed by cleansing; but the fine dead appearance of the silver, and also the burnishing, are quite destroyed;

the brilliancy of the surrounding colours is deteriorated, and the friction, however carefully the cleansing may be effected, carries off a portion of the metal, which is necessarily laid on very thin.

By M. Rousseau's very simple process, the silver is completely protected from the injurious action of the sulphur, in whatever quantity and in whatever state it may be. This statement is proved by various facts. The Ceramic Museum at Sèvres has possessed, since the year 1845, specimens which were placed there by M. Rousseau at that time, and at the end of eighteen months they did not appear to have undergone any change. As it was not evident, however, that they had been exposed to any sulphurous exhalations, while there, I requested M. Rousseau to furnish me with an article for the purpose of submitting it to the action of sulphuretted hydrogen gas; and he gave me the half of the tube of an opera-glass, which had been in use; this was exposed during several weeks in the chemical laboratory, and the only alteration it underwent was that it was turned slightly yellow; but this was easily removed by a little soap and water. Shortly afterwards the same piece was, together with the pretty little box now presented to the Society, fully exposed to the exhalations from a cess-pool, which was being emptied; and they were both, when taken out, in their present state of freshness. From this it became evident that M. Rousseau was in possession of the secret of giving to dead silver (which is much more easily affected by vapours than burnished silver) the power of resisting the deleterious action of the strongest hydrosulphuric exhalations.

This important object is effected by the employment of gold. A very thin layer of this metal is laid, by means of a brush, over the silver with which the porcelain is ornamented, before firing it, when, by the help of a flux and a cherry-red heat, the two metals are fixed on the porcelain.

This is the principle and mode of putting it in practice ; but its success depends upon the skill and experience of the operator. For instance, the silver must be dissolved in very dilute acid, and slowly precipitated, and the metallic precipitate must be well washed. The silver is then laid upon the porcelain before being coloured (or, if coloured, the colour must not be any preparation of gold,) in a pasty state, and left for twenty-four hours, at the expiration of which time the gold is to be laid on, and the article fired at a moderate heat.—*Ibid.*, from *Bulletin de la Société d'Encouragement*.

ART. XVII.—ON THE CONSTITUENTS OF LACTUCARIUM.

BY M. LUDWIG.

THE lactucone recently described by Lenoir is, according to Walz, nothing more than the lactuca fat examined by the latter. Thieme has likewise examined the body which is removed by ether from the alcoholic extract ; but he could not succeed in separating it, as stated by Walz, into a fat easily soluble in ether, and one of sparing solubility in that medium, on which account he named it *lactucerine*. Ruickoldt obtained lactucerine by frequent extraction of the lactucarium with absolute alcohol, evaporation, washing the crystals so obtained with water, re-solution in absolute alcohol, again rinsing the crystals with water, and desiccation under the air-pump. The lactucarium employed by the author for the preparation of lactucerine had been collected in the neighbourhood of Ilten near Hanover. It was

exhausted with water, and the insoluble residue treated several times with hot alcohol of 0.833. On the slow evaporation of the latter, a somewhat yellowish lactucerine was obtained, which was purified by washing with water, re-solution in alcohol and crystallization. The quantity of lactucerine amounted to 53.5 per cent.

Lactucerine forms snow-white aggregated granules, and dissolves in strong hot alcohol, from which it again separates on cooling; the alcoholic solution faintly reddens litmus paper. It dissolves readily in ether, but not in water, when pure. When warmed in a platinum dish, it becomes tenacious and transparent, like turpentine; when heated more strongly, it melts completely to a clear yellow oil, gives off white vapours possessing an agreeable odour, and is volatilized with the exception of a slight residue of a perfectly combustible cinder. Heated in a closed glass tube in a bath of chloride of zinc, it still continues pulverulent at 131° F., becomes decomposed at 158°, and disengages aromatic acid vapours at 200°. At 212° it experiences scarcely any loss; at 298° it becomes tenacious and like turpentine, without melting; at 320° it forms a thick liquid; between 356° and 374° it becomes thinner, and loses 2.110 per cent. The residue, again dissolved in spirit, separates, but still of a yellow colour. Melted at 374° in hydrogen gas, it gives off aromatic vapours, and loses 4.04 per cent. in weight. Submitted to destructive distillation, it melts, becomes yellow, and gives off white vapours, which condense to a colourless liquid; subsequently a yellow oily liquid distils over, and lastly a dark oil; the residue consists of a thin coating of a shining black coal. The gases which escaped produced no turbidness in lime-water, nor could they be set light to. The distillate consisted of a colourless aqueous acid layer and a heavier yellowish-brown oil. The odour was pungent, acid and aromatic. The acid aqueous liquid

gave no precipitates with oxide of mercury or silver; oxide of mercury dissolved in it without being reduced. The acid is evidently acetic acid. The oil did not dissolve entirely in alcohol, but readily in ether. Lactucerine cannot be saponified by caustic potash, but melts on evaporation to a brown mass, and is decomposed. The hydrate of sulphuric acid dissolves lactucarium immediately with a brown colour; nitric acid likewise dissolves it, and yields on evaporation a yellow residue soluble in ammonia. It gave on analysis—

Carbon,	76.202	77.286	77.090	40 =	76.650
Hydrogen,	10.654	10.832	10.902	34	10.719
Oxygen,	13.144	11.882	12.008	5	12.631

Two other experiments yielded results corresponding to the formula $C^{40} H^{33} O^4$, while Lenoir found for lactucone $C_6 H^{13} O^3$. It appears therefore that lactucerine prepared from fresh lactucarium may be converted into lactucone by the elimination of 1-2 equivs. water. Lactucone and lactucerine are distinguished from caoutchouc, a name which has sometimes been applied to them by containing oxygen. On examining a lactucerine which consisted of microscopic crystals, the author obtained exactly the same composition for it as for the amorphous; both agreed with Lenoir's formula, having been prepared from old lactucarium.

In order to determine the other constituents of lactucarium the author let the milk sap ooze out of the plant into distilled water. In a few moments it separated into a bright yellow clear solution and into white floating flakes; the portion insoluble in alcohol was digested several times with ether, and this then removed by distillation. It left a waxy body, which melted at a gentle heat, and produced a permanent stain of fat upon paper. The aqueous solution of lactucarium when fresh is perfectly neutral, but becomes sour on boiling. The liquid separated from the coagulated

albumen was exhausted with alcohol, and the alcoholic extract with ether :

Lactucerine or lactucone,	42.64	}	48.63
Waxy body, readily fusible	3.99		
Vegetable fibre, with a substance which swells in ammonia and is insoluble in water, alcohol and ether,	2.00	}	per cent. insoluble in water.
Albumen of a greyish colour,	6.98		
Extract soluble in water and in spirit,	27.68	}	51.37
Aqueous extract, insoluble in alcohol of 0.830,	14.96		
Lactucerine, held in solution in water by the other substances,	1.75	}	per cent. soluble in water.

From the bitter extract soluble in water and spirit the author obtained lactucic acid in the following manner : 80 grms. of lactucarium were rubbed to a fine powder, and then triturated in the cold with 80 grms. of pure dilute sulphuric acid, and subsequently mixed with 400 grms. of alcohol of 0.851, filtered, and the filtrate shaken with hydrate of lime until a filtered sample no longer afforded a precipitate with barytic water nor with oxalate of potash. The filtered alcoholic solution was then decolorized with pure animal charcoal and evaporated. A brown tenacious mass like turpentine separated, which dissolved in boiling water, leaving behind a tenacious viscous substance. On decolorizing the aqueous solution with animal charcoal and evaporating, a mixture of lactucic acid with Aubergier's lactucine remained; the latter separated from its solution in boiling water on cooling in white crystalline scales, and the lactucic acid was obtained on evaporation. This latter is readily soluble in water and alcohol, difficult to obtain crystallized, of a light yellow colour, and strongly bitter taste; it has no acid reaction. Solution of caustic soda, lime water, barytic water and caustic ammonia colour the acid immediately, or after some time, wine-red. A solution of sulphate of copper is not precipitated; but on the addition

of caustic soda and boiling, the oxide is reduced to protoxide, and the liquid acquires a dark brown colour; on adding now a little muriatic acid, brown humus-like flakes subside. There was no sugar contained in the acid, a point which was ascertained with certainty. A solution of acetate of lead gives a white precipitate; nitrate of silver is not precipitated, but on the addition of caustic ammonia and boiling, it is reduced to metal. The peracetate of iron yields with it after some time a white precipitate; concentrated sulphuric acid is coloured yellow in the cold; on the application of heat it becomes reddish brown and black, with evolution of sulphurous acid. Concentrated nitric acid is coloured faintly yellow by it. Heated in a platinum dish, the acid melts, becomes brown, gives off acid vapours, and leaves a voluminous cinder, which is entirely consumed.

Lactucine which has been decolorized with animal charcoal and purified by recrystallization, forms white pearly scales, the solution of which exhibits no reactions with basic acetate of lead, peracetate of iron and iodine water. Concentrated sulphuric acid affords a colourless solution with it in the cold; when heated, the liquid becomes yellow, brown, and finally black. Hydrated oxide of copper is reduced to protoxide by it and the addition of potash. Lactucine melts when heated, without being coloured; at a higher temperature it becomes brown, and leaves a porous cinder, which is easily burnt.

The aqueous solution of the alcoholic extract of lactucarium, after separation of the brown mass containing the lactucic acid, left on slow evaporation a yellowish-white somewhat crystalline mass, which, extracted with hot alcohol of 0.851, left on evaporation a neutral, insipid, sweetish body, crystallizable from water, but incapable of fermentation. The spirituous solution yielded on evaporation long silky prisms, which had all the characters of mannite.

The precipitate above obtained by agitation with hydrate

of lime was supersaturated with dilute sulphuric acid; the expressed liquid was purified with animal charcoal and evaporated to a syrupy consistence. On cooling, it congealed to an amorphous gelatinous mass, of an astringent, slightly acid taste. It was extracted with water, precipitated with acetate of lead, and the precipitate decomposed with sulphuretted hydrogen. On evaporating the liquid, white prisms, which behaved precisely like oxalic acid, crystallized from it. The mother-ley contained, along with sulphuric acid, a third organic acid, which has not been further examined, but which strongly reduced solution of silver. Lactucarium, extracted with spirit containing sulphuric acid, gives up to hot alcohol much lactucerine and a soft resin, together with oxalic and lactucic acid; no sugar or gum could be detected in it. Water removed from the residue sulphate of potash, sulphate of magnesia, and basic persulphate of iron; ether took up a tenacious waxy body, which was not further examined. 3 grms. of dry lactucarium, heated in a retort for six hours in a water-bath, yielded 0.18 gm. of an aqueous colourless acid distillate, which smelt of lactucarium; on digestion with oxide of zinc it lost its acid reaction, and on evaporation its odour. 1.40 gm. of lactucarium, distilled with 3 grms. of sulphuric acid and 12 grms. water, yielded an acid distillate, which smelt strongly of lactucarium, and which, on saturation with carbonate of lime and distillation with bisulphate of potash, afforded an acid liquid, which had a valerian-like odour, and contained no acetic acid.—*Chem. Gaz., from Archiv. der Pharm.*

ART. XVIII.—PATENT INKS, AND NEW SALTS OF GOLD.

Patentee, REV. J. B. READE, of Stone Vicarage, Aylesbury.

Blue Writing Ink.

1st. I manufacture, in manner following, a blue writing ink, which is wholly free from acid, and therefore well adapted for use with steel pens. I first obtain a solution of iodide of iron by the process ordinarily followed for that purpose, and then dissolve therein half the weight of iodine already employed. I next pour this mixture into a semi-saturated solution of yellow prussiate of potash, employing a weight of this salt nearly equal to the whole weight of iodine used in the above iodine solution. A decomposition of the materials thus brought together immediately takes place, when the cyanogen (of the prussiate of potash) and iron combine, and are precipitated in a solid form, and the potassium (of the prussiate) and iodine combine to form a neutral iodide of potassium, which remains in solution with a little excess of iodide of iron. I next filter and wash the solid precipitate of cyanogen and iron (which is soluble Prussian blue,) and finally dissolve it in water, which forms the blue ink required. In this process, it will be observed that neither any acid nor persalt of iron is employed, as is usual in the formation of Prussian blue.

I was led to these results by a microscopical examination of the metallic colours in salts of the ashes of plants. I employed iron and iodine to produce the same effects on pure salts; and in the course of my experiments I ascertained that these two substances (iron and iodine) have so great an affinity for each other, that when placed together without any water, or when rubbed together, they very speedily form a liquid, containing an excess of iodine in solution, which,

being added to a solution of prussiate of potash, gives the compound of cyanogen and iron, or soluble Prussian blue, which has been just described. The addition of water alters the character of this iodine solution; without water it turns litmus paper green, and with water it has the usual acid reaction, thus apparently confirming Davy's original doubt as to the elementary character of iodine.

2d. I form a neutral *iodide of potassium*, of great purity, and wholly free from alkaline reaction, in manner following:—I take the solution which remained over from the process first described, after the Prussian blue had been precipitated, which solution consisted, as before stated, of a neutral iodide of potassium, with iodide of iron in excess; and I get rid of that excess by the well-known processes of fusion and crystallization. The result is an iodide of potassium, which is as pure as when iodine and potassium are made to act directly on one another, and is perfectly free from the alkaline reaction on turmeric paper, which invariably characterizes the most careful preparations of this salt when carbonate of potassa is employed (as usual) in its manufacture. It is also much less deliquescent than the ordinary iodide of potassium of commerce, and, on account of its great purity, much to be preferred in medicinal preparations.

Blue Printing Ink, No. 1.

3d. I manufacture a blue ink of peculiar intensity, and, therefore, particularly suitable for printing purposes, by using the same materials, and manipulating them in the same way as first described, with the exception that for the iodine, wherever it is used, I substitute bromine, and rub up the precipitate in oil.

4th. I form a *bromide of potassium* of great purity, and wholly free from alkaline reaction, by treating the bromide of potassium, which remains over in a state of solution from the process last before described, in the same way as the

iodide of potassium solution is directed to be used under the second head of this specification.

Black Writing Ink.

5th. I manufacture a very superior black writing ink, by adding to gall ink of a good quality soluble Prussian blue, described under the first head of this specification. The addition of this Prussian blue makes the ink, which was already proof against alkalies, equally proof against acids, and forms a writing fluid which cannot be erased from paper by any common method of fraudulent obliteration, without the destruction of the paper.

Red Writing Ink.

6th. I manufacture, in manner following, a red writing ink, which is greatly superior to the common solutions from peach-wood and Brazil-wood, not only in permanent brilliancy of colour, but also in its freedom from acid, and consequent fitness for use with steel pens. I first boil cochineal repeatedly in successive quantities of pure water, till it ceases, or nearly so, to give out any colouring matter. I then boil it in water containing liquor ammoniæ, which combines after the manner of an alkali with an acid, with the residue of colouring matter, and leaves the insect matter nearly white. The liquid products of these successive boilings are then thrown together into an earthenware vessel, and in order to get rid of a peculiar element or principle still combined with the colouring matter, and which has a great affinity for iron, I precipitate the colouring matter with ammonio-bichloride of tin. The precipitate is afterwards dissolved in ammonia, and protiodide of tin added, till a sufficient degree of brilliancy of colour is obtained, which completes the process, water being added *ad libitum*, according to the degree of body desired to be given to the ink.

Marking Ink, No. 1.

7th. I manufacture, by the improved process following, a marking ink, which may be used with steel pens, and is not only of great intensity of colour, but comes out most readily on the application of heat. I rub together in a mortar nitrate of silver, and the proper equivalent of tartaric acid in a dry state. I then add water, on which crystals of tartrate of silver are formed and the nitric acid set free. I next neutralize this acid by adding liquor ammoniæ, which also dissolves the tartrate of silver. I finally add gum, colouring matter and water, in the usual way, and in quantities which may be varied at pleasure. By this process the nitric acid, which is essential to a good marking ink, is retained, and the tartrate of silver formed is soluble in less than half the quantity of liquor ammoniæ ordinarily required when tartrate of silver is the basis of the ink. The tedious operation of filtering and washing the carbonate of silver, in order to form the tartrate, is also thereby entirely dispensed with.

Marking Ink, No. 2.

8th. I manufacture, in manner following, a marking ink, differing from the preceding, and all other marking inks containing salts of silver only, in this respect, that it cannot be acted on by the common solvents of salts of silver, as cyanide of potassium or chloride of lime, and is so far, therefore, more indelible. I take the ink, as it has been formed by the process last described, and add to it an ammoniacal solution of an oxide, or salt of gold. I have used for this purpose, the purple of Cassius, the hydrosulphite of gold, the ammonio-iodide of gold, and the ammonio-periodide of gold. The two last salts, which I believe to be new salts, I obtain by dissolving iodine in liquor ammoniæ under the application of heat; an operation, however, which requires to be conducted with great caution, in order to prevent the formation of the explosive compound, the teriodide

of nitrogen. This iodine solution is a very speedy solvent of gold. If gold leaf be placed upon it without the addition of water, a black oxide of gold is formed, which immediately dissolves, but if it be diluted with water, the process of oxidation is less rapid, and the gold leaf assumes a fine purple colour (not black) before solution. This salt of gold crystallizes in four-sided prisms, which are soluble in water. A few drops of this solution placed on a slip of glass, generally form microscopic arborescent crystals, from which, under the application of heat, both the iodine and ammonia may be volatilized, and arborescent metallic gold alone remains. If a moderate heat only is employed, one equivalent only of iodine is dispelled, and white crystals of ammonio-iodide of gold remain.

Blue Printing Ink, No. 2.

9th. I manufacture a blue printing ink by taking the soluble precipitate of cyanogen and iron, obtained by the process described under the first head of this specification, and rubbing up the same in oil, after the manner ordinarily followed in the manufacture of printing inks; or by boiling down the blue writing ink produced by the said process, to a sufficient consistence, and then rubbing up the same in oil.

Black Printing Ink, No. 1.

10th. I manufacture a black printing ink by boiling down the black writing ink produced from the materials, and by the process described under the fifth head of this specification, and rubbing it up in oil as aforesaid.

Red Printing Ink.

11th. I manufacture a red printing ink by taking the ammoniacal solution of cochineal, obtained by the process described under the sixth head of this specification, and rubbing it up in oil, adding protiodide of tin according to the degree of lustre required; or by boiling down the red

writing ink, produced by the said process, to a sufficient consistence, and then rubbing up the same in oil as aforesaid.

Black Printing Ink, No. 2.

And, 12th, I manufacture a black printing ink by boiling chips of logwood (for which an extract of logwood may be substituted,) or other dye woods containing colouring matter and tannin, along with as much of a protosalt or persalt of iron, or copper, or other precipitate of tannin, as will be equal to about twice the weight of the tannin contained in the wood or extract employed; whereby I obtain a black or blueish black precipitate, the blueness of which I diminish, as may be required, by the addition of bichromate of potash, more or less. I finally rub up the whole in oil as aforesaid, adding a small quantity of the lamp-black or other black colouring matter, ordinarily employed in the manufacture of black printing inks.—*Pharm. Journ. from Mechanics' Magazine.*

ART. XIX.—ON A NEW AND ECONOMICAL PROCESS FOR MANUFACTURING THE BICHROMATE OF POTASH, CHROMATES OF LEAD AND BICHROMATE OF LIME.

BY V. A. JACQUELAIN.

1. CHALK and chrome ore, previously reduced to a very fine state of division, are intimately mixed in barrels revolving upon their large axis. It is especially requisite that the ore should be finely pulverized and passed through a very fine sieve.

2. The mixture is now calcined for nine or ten hours at a bright red heat upon the sole of a reverberatory furnace, taking care to spread it equally in a layer from 5 to 6 centim. in thickness, and to renew the surface ten or twelve times with the rake. At the end of this time, if the flame was sufficiently oxidizing, the conversion of the oxide of chromium into chromate of lime is effected. This is easily ascertained; in the first place from the appearance of the substance, which exhibits a yellowish-green colour,* and then because it has the property of dissolving entirely in hydrochloric acid with the exception of particles of sand.

3. The very friable and porous mass is now crushed under a mill, mixed with hot water, and the liquid mass constantly kept in agitation, and sulphuric acid added until the liquid slightly reddens blue litmus-paper. This character indicates the complete change of the chromate of lime into bichromate, and the formation of a little sesquisulphate of iron.

4. Some triturated chalk is now gradually added to the liquor until the whole of the peroxide of iron is removed. The bichromate of lime does not by this treatment experience any change as regards its state of saturation.

5. After being allowed to stand quiet for a short time, the clear supernatant liquid, which contains only bichromate of lime and a little sulphate, is drawn off; it may now be used immediately to prepare the bichromate of potash, the neutral and basic chromates of lead, and even the chromates of zinc, which will probably ere long be consumed to a great extent in the arts, since the oxide of zinc has already taken the place of carbonate of lead in white paint with drying oil.

*This singular peculiarity of the chromate of lime with an excess of base, of retaining the green tint of the oxide of chromium, must have led to the belief that no chromate of lime was produced, especially as the latter is scarcely soluble in water.

From the above it is seen that it is useless to prepare the bichromate of potash in order to obtain the insoluble chromates of lead, zinc, baryta, &c., which must render the preparation of these products considerably less expensive; they may readily be obtained by decomposing the bichromate of lime by the acetate or subacetate of lead, chloride of zinc, &c. With respect to the bichromate of potash, it may be as readily obtained, and in a perfectly pure state, by decomposing the bichromate of lime with a solution of carbonate of potash, which will give rise to insoluble carbonate of lime, which is easily washed, and a solution of bichromate of potash, which is concentrated and set aside to crystallize.—*Chem. Gaz. from Comptes Rendus.*

MISCELLANY.

The Tallow Tree.—The tallow tree (*Stillingia sebifera*) is abundant in the valleys of Chusan, and large quantities of tallow and oil are yearly extracted from its seeds: tallow mills are erected in several parts of the island for this purpose.

For the following account of the Chinese method of extracting the tallow from the seeds of the *Stillingia sebifera*, I am indebted to Dr. Rawes, of the Madras army, who was sometime resident in the island of Chusan:—

Method of obtaining the Tallow.

“The seeds are picked at the commencement of the cold weather, in November and December, when all the leaves have fallen from the trees,—this I saw at Singkong when out shooting in the Sah-hoo valley, close by our quarters, through the village. The seeds are in the first place taken to the building where the process of making the tallow is carried on, and picked and separated from the stalks. They are then put into a wooden cylinder, open at top, but with a perforated bottom. This is placed over an iron vessel (about the same diameter or rather larger than the wooden cylinder, and about six or eight inches deep) containing water, by which means the seeds are well steamed, for the purpose of softening the tallow and causing it more readily to separate. The furnace I saw had four or five iron vessels in a row, was about three feet high, four or five feet broad, and eight or ten feet long. The fire was placed at one end, and fed with the husk of the rice, dry grass, and such like cheap materials which make a great flame, and the flue was of course carried directly under the whole of the iron vessels.

“When the seeds have steamed ten minutes or a quarter of an hour, they are thrown into a large stone mortar, and are gently beaten by two men with stone mallets for the purpose of detaching the tallow from the other parts of the seed. They are then thrown upon a sieve, heated over the fire, and sifted, by which process the tallow is separated, or nearly so, although they generally undergo the process of steaming, &c., a second time, that nothing may be lost. The other part of the seed is ground and pressed for oil.

"The tallow now resembles coarse linseed meal, but with more white spots in it, and derives its brown colour from the thin covering over the seed (between it and the tallow) which is separated by the pounding and sifting. In this state it is put between circles of twisted straw, five or six of which are laid upon each other, and thus forming a hollow cylinder for its reception. When this straw cylinder (we may call it so) has been filled, it is carried away and placed in the press, which is a very rude and simple contrivance, but which, like every thing Chinese, answers the purpose remarkably well. The press consists of longitudinal beams of considerable thickness, placed about a foot and a half, or two feet asunder, with a thick plank at the bottom, forming a kind of a trough, and the whole is bound together with iron. The tallow is pressed out by means of wedges driven in very tightly with stone mallets, and passes through a hole in the bottom of the press into a tub, which is sunk there to receive it. It is now freed from all impurities, and is a semifluid of a beautiful white colour, but soon gets solid, and in cold weather is very brittle. The inside of the tubs which collect the tallow are sprinkled or dusted over, with a fine red earth, well dried, which prevents the tallow from adhering to their sides. It is thus easily removed in a solid state from the tubs, and in this condition the cakes are exposed for sale in the market. As the candles made from this vegetable tallow have a tendency to get soft and to melt in hot weather, they are commonly dipped in wax of various colours, as red, green, and yellow. Those which are intended for religious purposes are generally very large, and finely ornamented with golden characters.

"The cake, or refuse, which remains after the tallow has been pressed out of it, is used for fuel, or to manure the land, and so is the refuse from the other part of the seeds from which oil is extracted."

Pharm. Jour., from Fortune's Wanderings in China.

Opium Smuggling.—The statements which have been frequently made in England, both as regards the smuggling and the smoking of opium, are very much exaggerated. When I first went to China, I expected to find those merchants who were engaged in this trade little else than armed buccaneers, indeed, if I do not mistake, they have been represented as characters of this kind on the English stage. Instead of this, the trade is conducted by men of the highest respectability, possessed of immense capital, and who are known and esteemed as merchants of the first class in every part of the civilized world. The trade in opium, although contraband, is so unlike what is generally called smuggling, that people at a distance are deceived by the term. It may be quite true that its introduction and use are prohibited

by the Chinese government; but that prohibition is merely an empty sound, which, in fact, means nothing. The whole, or at least the greater part of the mandarins use it, and it is not at all unlikely that his Celestial Majesty himself makes one of the number of its devotees. The truth is, the Chinese government, whatever it may say, has no wish to put a stop to its introduction. It is necessary, however, to publish every now and then strong threatening edicts against it, which are only consigned to oblivion in the pages of the Peking Gazette, and have no effect whatever in restraining the Emperor's loyal subjects. It is now the opinion of all intelligent foreigners, and also many of the more enlightened amongst the Chinese themselves, that the importation of opium ought to be legalised, and it should be admitted at a small duty, as, by this means, much of the demoralising effects of smuggling would be got rid of, and a considerable revenue would flow into the coffers of the Chinese treasury.

Many instances of the feeble kind of opposition which the Chinese government employ to stop the opium trade, occurred during my residence in the country. Sometimes an admiral, renowned for his valour, was sent with a number of war-junks to a particular station, where the opium ships were anchored, for the purpose of compelling them to leave the Chinese shores. Gongs were beat, guns were fired, at a respectful distance, however, and the junks came down with all that pomp and parade which the Chinese know so well how to assume, and which seem to form a principal part of their warlike operations. In the mean time the little opium vessels were seen quietly at anchor, apparently paying but slight attention to all these threatening demonstrations. Presently a message was sent from the admiral, ordering them to get up their anchors and stand out to sea, and never more to dare to enter the waters of his Celestial Majesty under the penalty of being completely annihilated.

A summons like this in former days might have had some weight, but now it had none; and the only answer the messenger carried back was, "that the foreign vessels were well armed, and that they would not leave their anchorage." This was quite sufficient to cool the courage of the admiral, who was now in a dilemma; he durst not fight the "barbarians," and if he did not manage to get them out of the way, his character for courage would suffer when the affair was represented at head-quarters. He therefore altered his tone, and *requested* the captains, as a great favour, to leave the anchorage and move outside for a day or two only, after which time they might return to their old quarters. This was agreed to on the part of the captains of the opium vessels, and on the following morning they got under weigh and went out to sea. The Chinese, who were on the look-out at the

time, made a great noise by beating gongs and firing guns, and followed the opium ships until they were fairly outside. The admiral now, sent up a report to his government to the effect that he had fought a great battle with the "barbarians," and had driven them away from the shores; or very probable he said that he had blown some of their vessels to pieces, and sunk the rest in the depths of the sea. In the mean time, even before the report was half-way to Peking, the opium vessels had quietly taken up their old anchorage, and things were going on in the usual way! Such is a specimen of the way in which affairs are managed in China.—*Ibid.*

Opium used in China.—The opium from Bengal, which consists of two kinds—namely, *Patna* and *Benares*—is always of a good quality and pure; but the Bombay *Malwa* is now so much mixed up with other ingredients, that the Chinese smuggler will not buy it until he has had an opportunity of testing its quality. This is done in the following manner:—having selected the chest or number of chests which he wishes to purchase, they are opened, and he takes out three or four of the worst looking cakes, cuts a small piece from each, and dissolves them in a copper ladle over a charcoal fire. When the opium is melted, it is poured out into a coarse paper filter. If it is not of the worst description it readily passes through the paper into a small basin which is placed under it. When it will not pass through the filter, the Chinese call it *Man-ling*; by which name they designate opium which is so bad, or so mixed with extraneous ingredients, that it will not dissolve in water or pass through the paper filter. This description of the drug, is of course, only bought at a very reduced price.

When the mixture passes through the filter, the paper is carefully examined, and if any sediment remains, such as sand or rubbish, with which the opium is frequently adulterated, it detracts considerably from its value. The filtered mixture is now put again into a clear copper pan, and boiled slowly over the charcoal fire, until the whole of the water is evaporated, and nothing remains but pure opium. The drug is then poured out into a small porcelain cup, and stirred round and examined with great care. At this stage of the process, colour forms the principal test of its quality, and as the smuggler stirs it round, and holds it up to the light, he pronounces it to be "*tung-kow*," if it is thick like jelly; "*pak-chat*," if it has a whitish colour; "*hong-chat*," if it is red; and "*hong-see-pak*," if it is opium of the first quality, or like that sent round by the East India Company.—*Ibid.*

Opium Smoking.—Opium is prepared for smoking much in the same manner as I have described, and is kept in small cups, which are

made for the purpose. The smoker lays his head on a pillow, has a lamp by his side, and with a kind of needle he lifts a small portion of the opium to the candle, and having ignited it, he puts it into the small aperture of the bowl of the pipe. The candle is applied to the bowl during the process of inhaling; and the smoke is drawn into the lungs in the same manner as an Indian or Chinese swallows tobacco. A whiff or two is all that can be drawn from a single pipe, and, therefore, those who are accustomed to the use of the drug have frequently to renew the dose.

No one who has seen any thing of the habits of the Chinese will deny that the use of opium, particularly when taken to excess, has a most pernicious effect both upon the constitution and morals of its victims. From my own experience, however, I have no hesitation in saying that the number of persons who use it to excess has been very much exaggerated; it is quite true that a very large quantity of the drug is yearly imported from India, but then we must take into consideration the vast extent of the Chinese empire, and its population of 300,000,000 of people.* I have often been in company with opium-smokers when travelling in different parts of the country, and am consequently able to speak with some confidence with regard to their habits. I well remember the impressions I had on this subject before I left England, and my surprise when I was first in the company of an opium-smoker who was enjoying his favourite stimulant. When the man lay down upon the couch, and began to inhale the fumes of the opium, I observed him attentively, expecting in a minute or two to see him in his "third heaven of bliss;" but no: after he had taken a few whiffs he quietly resigned the pipe to one of his friends, and walked away to his business. Several others of the party did exactly the same. Since then I have often seen the drug used, and I can assert, that in the great majority of cases it was not immoderately indulged in. At the same time I am well aware that, like the use of ardent spirits in our own country, it is frequently carried to a most lamentable excess. Lord Jocelyn, in his "Campaign in China," gives the following account of its effects, which he witnessed upon the Chinese at Singapore: "A few days of this fearful luxury, when taken to excess, will give a pallid and haggard look to the face, and a few months, or even weeks, will change the strong and healthy man into little better than an idiot or skeleton. The pain they suffer when deprived of the drug after long habit, no language can explain: and it is only when to a certain degree under its influence that their faculties are alive. In the houses devoted to their ruin, these insatuated people may be seen at

* The population of China has been estimated lately at 367,000,000.

nine o'clock in the evening in all the different stages; some entering half distracted to feed the craving appetite they had been obliged to subdue during the day: others laughing and talking wildly under the effects of a first pipe; whilst the couches around are filled with their different occupants, who lie languid with an idiot smile upon their countenance, too much under the influence of the drug to care for passing events, and fast merging to the wished-for consummation. The last scene in this tragic play is generally a room in the rear of the building, a species of dead-house, where lie stretched those who have passed into the state of bliss the opium-smoker madly seeks—an emblem of the long sleep to which he is blindly hurrying."—*Ibid.*

Action of Hydracids upon Oxyacids. By C. LECOMTE.—The action of hydracids upon the oxyacids has not hitherto been investigated in a general manner. We possess, in fact, but a memoir by M. Baudrimont upon the formation of nitromuriatic acid, by the reciprocal action of hydrochloric and nitric acids dissolved in water; and a notice by M. Millon, who observed that sulphuretted hydrogen was without action upon nitric acid previously deprived of hyponitric acid by means of nitrate of urea and diluted with twice its volume of water. I trust therefore that the following researches will prove interesting to chemists.

The apparatus which I have employed to study the action of hydrosulphuric acid upon nitric acid is very simple. It is composed of a balloon communicating with a washing-flask, and this with a second flask surmounted by a tube for collecting the gases; when all is thus arranged, some fragments of the sulphuret of antimony and hydrochloric acid are conveyed into the balloon and some milk of lime into the washing-flask. The balloon is placed over a charcoal furnace. When all the air of the apparatus had been expelled, 85 grms. of nitric acid of 1.33 spec. grav., freed from hyponitric acid by means of nitrate of urea, were poured into the second flask kept in water, which was carefully maintained at a temperature of 64°–68° F.

On the appearance of the first bubbles of sulphuretted hydrogen in the nitric acid, a considerable number of minute bubbles were observed to be disengaged from different points of the liquid; at the same time sulphur separated and remained in suspension; the atmosphere of the flask became of an orange colour, and the nitric acid so intensely green as to prevent the passage of light; gradually this colour diminished, and the sulphur aggregated into a mass at the surface of the liquid. The action was continued until the sulphuretted hydrogen passed through the nitric acid without experiencing any change.

The sulphur obtained in this manner formed an opaque spongy mass of a pure yellow colour. After freeing it by washing from the acid liquid it contained, although obtained in the cold, it exhibited all the elastic properties presented by soft sulphur obtained with the assistance of heat and immersion in cold water. Nevertheless, in the circumstances under which the experiments were made, the temperature never rose above 68° – 77° ; the chemical reaction sufficed therefore to produce a phenomenon which under ordinary circumstances requires an elevation of temperature of about 482° . This sulphur was kept for eight days in water; it was still somewhat elastic, and its colour had but slightly decreased.

The gases which are disengaged in the preceding operation vary according to the period when they are collected. At the commencement, and for about three hours, they consist of a mixture of deutoxide of nitrogen and of hyponitric acid; the latter gradually disappears, and is replaced by sulphuretted hydrogen. It will presently be seen that the presence of one of these two gases in a mixture indicates the absence of the other; in a word, these two gases are incompatible.

The mixture of deutoxide of nitrogen and of sulphuretted hydrogen which is disengaged during the remainder of the operation, exhibits a very remarkable phenomenon; it is partly decomposed in passing through water, which is rendered milky by the eliminated sulphur; but the bubbles which burst at the surface form, when the air is undisturbed, very regular rings, analogous to those presented by phosphuretted hydrogen when it ignites spontaneously on its issue from water. This phenomenon is readily explained by the action of hyponitric acid upon sulphuretted hydrogen; these two gases being incompatible, and each bubble being a mixture of sulphuretted hydrogen and deutoxide of nitrogen, the air acting upon the latter by its oxygen converts it into hyponitric acid, which in its turn decomposes the sulphuretted hydrogen; and as this action is only exerted upon the central and peripheral parts which are in contact with the air, the rings above mentioned are formed.

The following experiments prove decidedly that hyponitric and hyposulphuric acids are not compatible. If a bell-glass containing a mixture of deutoxide of nitrogen and sulphuretted hydrogen is observed, the gases are not decomposed immediately; but on introducing merely a few bubbles of oxygen, the gases are coloured, sulphur is deposited upon the sides of the vessel, and the colour disappears; a further addition of oxygen reproduces the same phenomena, which can be repeated until the sulphuretted hydrogen has entirely disappeared. This curious reaction of the deutoxide of nitrogen promises

to be of considerable importance in the industrial arts. Sulphur does not occur in France, but considerable quantities of sulphate of lime; this decomposed with coal, and the moist sulphuret obtained decomposed in its turn by the carbonic acid derived from any furnace, would yield sulphuretted hydrogen. This gas, conveyed into a chamber containing air and deutoxide of nitrogen, would furnish water and sulphur; so that a small quantity of deutoxide of nitrogen would suffice in this case, as in the preparation of sulphuric acid, for the transformation of a large quantity of the reacting bodies.

In Berzelius's "Manual of Chemistry," it is stated that the deutoxide of nitrogen and sulphuretted hydrogen are mutually decomposed; that sulphuret of ammonium or the hydrosulphate of ammonia and the protoxide of nitrogen are formed. This reaction is true when the gases are moist, but when dry they do not react upon each other.

The liquid derived from the action of the sulphuretted hydrogen upon the nitric acid was separated from sulphur and again mixed with the wash-waters of this latter body; the whole was saturated hot with carbonate of baryta until the appearance of a slight ammoniacal odour; a few drops of sulphuric acid were added to neutralize the liquid; it was then thrown upon a filter, the precipitate of sulphate of baryta well washed, and all the liquids united and evaporated until there remained but 100 grms.; the crystalline residue kept for several hours at a temperature of 113° , weighed 3.80 grms. Analysis has proved that this salt is formed almost entirely of sulphate of ammonia, containing so minute a quantity of the nitrate that the protosulphate of iron is scarcely coloured by it in the presence of sulphuric acid.

Chem. Gaz. from Ann. de Chim.

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APRIL 1848.  
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ART. XX.—ON EUONYMUS ATROPURPUREUS ET AMERICANUS.

BY CHARLES A. SANTOS, Norfolk, Virginia.

(*An Inaugural Essay.*)

Nat. Ord. CELASTRACEÆ.

Sex. Syst. *Pentandria Monogynia.*

EUONYMUS. Sepals 4-5 (rarely 6,) united at the base, forming a short flat calyx. Petals 4-5 (rarely 6.) Stamens inserted on the upper surface of the broad and flat disk: filaments short, the base persistent: anthers with a thick connectivum at the back, opening transversely or longitudinally. Ovary immersed in the disk, with as many 2-3 ovuled cells as petals: styles united, short and thick: stigmas united into one, obtuse or lobed. Capsule 4-5-lobed, 4-5-celled, loculicidal. Seeds usually enclosed in a fleshy red or purple aril. Embryo with broad foliaceous cotyledons: albumen fleshy and oily. Shrubs, sometimes trailing or climbing by rootlets. Leaves opposite, serrate. Stipules mostly none. Peduncles axillary, 1, many-flowered: inflorescence cymose.—*Torrey & Gray, Flora N. Amer.*

EUONYMUS ATROPURPUREUS, (Jacq.) branches smooth:—leaves (rather large) oval or elliptical, oblong, acuminate, mostly acute at the base, finely serrate, on distinct petioles,

perverulent beneath ; peduncles compressed, several-flowered : parts of the flower usually in fours : petals roundish, obovate : capsules smooth, deeply lobed.—*Jacq.*

Flowers June, July. Shrub 4-12 feet high ; the branches slightly 4-sided. Leaves 2 to 5 inches long. Petals dark purple. Capsule crimson when mature. Seeds nearly white, invested with a bright red succulent aril.—*Torrey & Gray, Flor. N. Amer.*

Common Names. Burning-bush, Spindle-tree.

EUONYMUS AMERICANUS, (Linn.) ; Branches smooth, 4-sided ; leaves varying from elliptical-lanceolate to oval obovate ; on very short petioles : rather obscurely serrate, glabrous, peduncles 1-3-flowered : petals roundish-obovate : capsules depressed globose, verrucate-echinate.—*Willd.*

Flowers May to June. Branches slender, green. Leaves 1-2 inches long, coriaceous, nearly evergreen in the Southern States. Parts of the flower mostly in threes or fives. Segments of the calyx very short and roundish. Petals greenish-yellow, tinged with purple. Capsule deep crimson when mature, slightly angled, densely muricate or warty ; the dissepiments and aril scarlet. Seeds smaller than in the preceding, 1-3 in each cell. Both species are very ornamental in autumn when the fruit is ripe.—*Torrey & Gray, Flor. N. Amer.*

Common Names. Strawberry-tree, Burning-bush.

The Wahoo Bark, the subject of the present paper, is derived from the preceding varieties of *Euonymus*. These shrubs are found throughout the United States and Canada, preferring rich soil and shady situations. In addition to the above name, which was conferred on these plants by the Indians,* they have also received the title of the Indian Arrow Wood, from the straightness of their trunks. From Dr. S. W. Ripley, of Ohio, information concerning this bark, and the shrub affording it has been received ; and in the locality in which he found it, it usually occurred in low grounds in the vicinity of creeks, and never attained

a height of more than twelve feet. I have, however, been informed that in Kentucky its height sometimes exceeds twenty feet.

It has been stated that the bark derived from the root is more highly charged with medicinal properties, except when the plant is in full vegetation, when that from the twigs is more efficient.

The bark of the trunk and branches has alone been examined by the writer. This is in pieces from four to ten inches in length, a half to two lines in thickness, partly or perfectly quilled, and covered with an ash-coloured epidermis, which is corrugated in some instances, sometimes quite smooth, and in other specimens having a verrucose structure. Internally it is usually white, but not unfrequently has a yellow hue.

The fracture is splintery, and on account of its ligneous fibrous nature, it does not readily yield to the action of the pestle.

Chemical Examination.

Various experiments were pursued with this bark with a view of isolating any active principle present therein, and the following one only accompanied with satisfactory indications. A strong decoction was prepared, the gum, colouring principle, &c., precipitated by subacetate of lead, and the excess of lead removed by hydrosulphuric acid. The clear liquor possessed the bitter taste of the bark. It had an acid reaction, which, it is presumed, arose from acetic acid resulting from the decomposition of the acetate of lead. A solution of tannic acid produced a precipitate. Placed in a capsule on a sand bath, and evaporated, a brownish adhesive substance, soluble in ether, alcohol and water, remained. The taste of the latter is bitter at first, afterwards acid and persistent.

Other experiments induce the impression that future researches may produce successful results.

With iodine the decoction of the bark afforded no evidence of starch.

Subacetate of lead caused a copious deposite, thus evidencing gum.

The infusion of galls produced an abundant precipitate. The infusion behaved in like manner with the several reagents, and with nitrate of silver and bichloride of mercury, the presence of vegetable albumen was shown.

The tincture, prepared with alcohol 35° Baumé, was of a beautiful yellow colour. The addition of water rendered it turbid. No change was produced by it on litmus paper, or on the same reddened. Exposed to heat, a reddish resin and greenish fixed oil remained. One ounce of the bark was exhausted by displacement with eight fluid ounces of diluted alcohol. A clear tincture of a reddish colour was afforded, which possessed in a great degree the bitterness of the bark. Five fluid ounces yielded on evaporation twelve grains of a brownish-red resinous extract apparently rich in the properties of this article.

The ethereal tincture, which was of a greenish-yellow colour, on being exposed to heat, afforded the oil and resin obtained by the alcoholic treatment. On an adult, two grains of the latter produced a cathartic effect.

A portion of the bark was subjected to distillation, and the product found impregnated with its peculiar odour. On the surface greasy spots were observed; the sides of the receiver somewhat oily, and moreover the liquid slightly milky.

From these and other indications, there is little doubt that a volatile oil exists in small amount. The ashes were examined, and potash, lime and iron recognized by their appropriate tests.

The important medical properties of a diuretic, tonic, antiperiodic, and hydragogue cathartic, have been ascribed to this bark, but its beneficial effects in the different forms of dropsy, have given it celebrity and procured its introduc-

tion as a medicine. It is usually employed in the forms of decoction and infusion. As a diuretic, these preparations are generally made in the proportion of an ounce to a pint of water, and administered in doses of a wineglass full. For exhibition as a tonic, two drachms to the same quantity of water, and given in like doses.

In closing, it may be remarked, that on account of the importance of this indigenous medicinal agent, it merits and will receive further examination. By some western practitioners it is much used, and regarded as an efficient medicine. If such be indeed the case, it is hoped that its employment will be more general, and that ere long it will be added to the list of efficient remedies.

ART. XXI.—PHARMACEUTICAL NOTICES.

By WILLIAM PROCTER, JR.

Fluid Extract of Buchu. Buchu leaves contain, according to Cadet de Gassicourt, *volatile oil, resin, chlorophylle*, extractive and twenty-one per cent of gummy mucilage, soluble partly in cold, but wholly in boiling water, and communicating to that fluid by ebullition, a considerable ropiness which is manifest in the officinal infusion.

As a remedy in diseases of the bladder, it is held in much esteem by some physicians, and as its use requires to be continued for a length of time, it has been thought; that a preparation embodying all the medical virtues of the drug, so concentrated as to require but a small dose, and yet sufficiently permanent to be kept for a length of time, would be a desideratum.

The following formula, which is very easy of execution, is proposed, viz :

Take of Buchu leaves,	-	8 ounces, (Troy.)
Alcohol,	- -	16 fluid ounces,
Water,	- -	a sufficient quantity.

Reduce the leaves to coarse powder, moisten them in a covered vessel, with twelve fluid ounces of the alcohol, macerate them for six hours, and introduce the whole into a suitable displacer. When the clear fluid has ceased to drip, add the remaining alcohol mixed with four fluid ounces of water, gradually, until the displaced alcoholic liquid amounts to twelve fluid ounces, which is set aside until reduced to six fluid ounces by spontaneous evaporation. The residue in the displacer is then treated with a pint of cold water, by maceration for twelve hours, and subjected to pressure until a pint of aqueous liquid is obtained. (Displacement may be resorted to, but the mucilage renders it ineligible.) This is evaporated to ten fluid ounces, mixed with the six fluid ounces of evaporated tincture, and after occasional agitation for several days may be filtered or strained, to remove the undissolved resinous and gummy matter.

Thus prepared, it had a dark brown colour, a strong and rather purgent taste of Buchu, and is administered in doses of one or two teaspoonfuls, which represents half a dram to a dram of the leaves.

I have prepared this fluid extract by evaporating the tincture to four fluid ounces, the infusion to eight fluid ounces, and then dissolving in the mixture eight ounces of powdered sugar by agitation.

Dr. M. Clymer, who has used this preparation, and approves of it, prefers the first formula to the last, as he finds the patients to whom it was administered had a disinclination for sweet drinks.

Fluid Extract of Taraxacum. Under the name of "Liquor Taraxaci," a fluid preparation of dandelion has

been used for some years past in England, and is justly esteemed.

The following formula, which differs in some respects from the English, I believe to yield an excellent preparation.

Take thirty-two ounces of fresh dandelion root, collected in September or October, slice it transversely, and reduce to a pulp by bruising. Mix this with one-sixth of its bulk of alcohol; macerate for twenty-four hours, then express strongly. Add a pint of water, containing a little alcohol, and again express. Evaporate the liquid to twelve fluid ounces; add four fluid ounces of alcohol, and filter. A teaspoonful of this fluid extract represents half a dram of extract of dandelion, obtained from the expressed juice, which is several times the strength of that obtained by boiling the root in water, as directed by the Pharmacopœia.

If alcohol should be objectionable in certain cases, eight ounces of sugar may replace it in the above formula, it being dissolved by agitation.

As it is always attended with inconvenience, to make such preparations at only one season of the year, the fluid extract may be made from sixteen ounces of the dried root that has been collected as above, reduced to coarse powder, macerated in two pints of water mixed with half a pint of alcohol, for two days expressed, &c., as in the other case.

Extractum Spigeliæ et Sennæ. Fluid Extract of Pinkroot and Senna. A preparation of this character is not new, as a fluid compound, analogous in its medical ingredients to the ordinary "worm tea," was published several years since in this Journal, by Thomas Eastlack, Jr.

The preparation now proposed, was in use before the publication of the above noticed formula, and has continued ever since to be employed by physicians, and in domestic practice, with satisfactory results. Its permanence, and the readiness with which children take it, are additional motives for its employment.

Take of Pink root,	-	-	-	(Av.) 16 ounces.
Senna,	-	-	-	8 ounces.
Powdered sugar,	-	-	-	24 ounces.
Carbonate of potassa,	-	-	-	1 ounce.
Oil of Caraway,				
Oil of Anise, of each				half a dram.
Diluted alcohol,				a sufficient quantity.

The pink root and senna are reduced to coarse powder, mixed with two pints of diluted alcohol, and macerated for two days. The mixture is then placed in a displacer, and more diluted alcohol gradually added, until five pints of tincture have passed, observing that the liquid passes slowly and regularly. This is evaporated in a water bath to twenty fluid ounces, and the carbonate of potassa added and mixed, which dissolves the resinous and extractive sediment. The volatile oils are now triturated with a portion of the sugar, and then with the rest, and the whole mixed with the evaporated liquid, and by means of a very gentle heat cause the solution of the sugar. The whole should measure, when completed, two pints.

The carbonate of potassa, not only gives solubility to the matters deposited by the evaporation of the alcohol, and corrects the griping tendency of the senna, in part, but itself, in the opinion of some, possesses anthelmintic power. The relation of the two chief ingredients is that in which they are most usually prescribed.

The dose varies from half a teaspoonful to a child of one or two years, to a tablespoonful for an adult.

Tincture of Aconite root. The concentrated tincture of aconite root, proposed by Dr. Turnbull, of Edinburgh, as a substitute for the more expensive active principle, *aconitia*, is an efficient preparation, if well made. Dr. Turnbull's formula directs that a pound of the root, properly divided, should be treated with a pound and a half of alcohol, expressed and filtered. The observations of M. Personne, on

a variety of drugs, has proven that a certain amount of menstruum is absolutely necessary to exhaust them, and this varies from four to five times their weight; consequently the formula of Dr. T. does not exhaust the root. The following mode of treatment will yield a tincture possessed of all the active parts of the quantity of root named:

Take of Aconite root in powder, 16 oz., (Troy.)

Alcohol, (sp. gr. .835) a sufficient quantity.

Mix the powder with a pint and a half of the alcohol, and allow it to macerate for forty-eight hours, introduce the mixture into a displacer, cover the surface with a piece of filtering paper, and return the fluid until it passes clear, then add alcohol in small portions at a time, suffering each to disappear before the next is added, until the amount displaced measures four pints. This is then reduced by evaporation or distillation, to two pints, when the tincture should be filtered if necessary, and is then complete.

Glycerin, as a remedy in cutaneous diseases, and as applied in certain processes of pharmacy. The sweet principle eliminated from the fixed oils in the process of saponification, has recently attracted some attention from the observations of J. Startin, Esq., Surgeon to the London cutaneous institution, (Med. Times, Aug. 7, 1847,) and (Braithwaite's Retrospect, part 16, page 226.)

Glycerin was discovered by Scheele. Chevreul first recognized its importance and extensive existence in nature, and in conjunction with Pelouze, has given the exact nature of this body. It exists naturally combined with various oily acids, giving rise to the respective neutral oily principles, stearin, olein, &c. It is, when perfectly pure, a colourless syrupy liquid, without odour; a decided sweet taste, and has the sp. gr. 1.25 to 1.27. It dissolves in water and alcohol in all proportions, but is insoluble in ether. It is slightly volatilized when boiled with water, but is destroyed by distillation, *per se*, yielding acrolein, the acrid principle of burnt fats, and itself burns with a luminous flame. It combines

with sulphuric acid, and also with potash and baryta. Its solvent powers are very extensive, dissolving amongst other substances, oxide of lead, all the deliquescent salts, sulphates of potassa, soda and copper, nitrate of silver, nitrate of potassa, &c.

Glycerin is most easily obtained by the saponification of olive oil in making lead plaster. The water in which the plaster is malaxated, abstracts the glycerin, holding in solution a little oxide of lead. The solution is evaporated till reduced to a very thin, syrupy consistence; sulphuretted hydrogen passed through it to separate the lead, the solution then heated to remove the excess of gas, and evaporated at a temperature of 150° Fahr. till it ceases to lose weight. It yet contains water which may be removed by placing it in a vacuum, over sulphuric acid. As thus obtained, it will be more or less straw coloured, but is sufficiently pure for medical purposes. Large quantities of glycerin are thrown away in the residual saline liquid, in the manufacture of soap. It may be obtained from this by neutralizing the free alkali with sulphuric acid; evaporating to a syrup, and treating the syrupy saline residue with concentrated alcohol, which dissolves the glycerin, and leaves the sulphates. The product requires to be treated with charcoal, to decolorize it, and is less likely to be pure, than that obtained from lead plaster.

Dr. Startin makes the following remarks in reference to the medical and physical properties of this agent, viz :

“ The antiseptic and undrying properties of glycerin, first led me to attempt its use for medical purposes, as I believed by means of such properties, lotions, poultices, baths, &c., might be rendered peculiarly emollient and soothing, when preternatural dryness, roughness, or harshness of the skin was present, and particularly in those cases where the hair or scalp was involved, as in instances of dandriff or pityriasis of these parts; my expectations were more than realized by reducing my conjectures to practice, and I found that by

the addition of one-fourth to one-eighth, or even one sixteenth of glycerin, to any lotion, poultice, or external application, all the indications I have mentioned were fulfilled, and that such application never became perfectly hard and dry, whilst it soothed and tranquillized the diseased part, by attracting moisture from the air, and thus keeping up a constant evaporation from the surface; its antiseptic properties, also, in great degree, prevented the unpleasant odour of vitiated secretions or discharges, whilst its undrying nature, did not permit the formation of hard scabs or incrustations, which, it is well known, very often interfere with the healing process, and occasion much pain on their removal. I have had little experience in the use of glycerin internally, but it is a mild stimulant, antiseptic, and demulcent, and might be employed to sweeten many articles of food or drinks, for those invalids whose disordered digestive organs would forbid the use of sugar. Pills made with the addition of a few drops of glycerin never become dry, and syrups and extract by its means, are kept from evaporation to dryness, as also from fermentation, and the formation of cryptogamic vegetation or mouldiness, and many other such uses for this agent, will not fail to suggest themselves. I shall briefly enumerate some diseases of the skin, in which I have employed glycerin with most benefit and success. These are pityriasis or dandriff, (particularly that form of the disease which I have termed *P. congenita*,) lepra, *psoriasis*, lichen (in its dry, advanced stage,) impetigo inveterata, and prurigo. I have found glycerin, also, a useful addition to lotions in the incrustated form of lupus or herpes excedens, and to various syphilitic or strumous eruptions, which have a tendency to produce fetid discharges, and hard crusts; for which reason it has proved of service in the scabbing stage of small-pox. As a wash for the hair, or for chapped hands, face, or nipples, combined with a little rose water, and a few grains of the borax, (the glycerin being in the proportion of 1-16th,) this remedy furnishes, per-

haps, one of the most elegant and efficacious preparations which has been introduced. It may also be combined with soaps, which it renders peculiarly softening and efficient, particularly to individuals who have a dry or hard skin."

The antiseptic, softening properties, as stated by Dr. S., will render this a useful agent in pharmacy, independent of its medical relation, if borne out in practice. In blue pill, quinine pills, and many others where hardening is to be avoided, and where water would cause mouldiness in close vessels, this agent is said to answer without this change. Dr. Clymer, who prescribed the following mixture in a case of lichen, found it perfectly successful.

Take of glycerin,	-	-	-	-	f. ʒj.
Borax,	-	-	-	-	grs. x.
Rose water,	-	-	-	-	f. ʒviij
Make a lotion,					mix.

This lotion was applied three times a day. Its efficacy in chapped hands has been proven in two cases under my own notice.

ART. XXII.—ON THE PREPARATION OF CHLOROFORM.

By M. SOUBEIRAN.

THE following is the process which I now employ for preparing this substance, the publication of which, although perhaps somewhat premature, I shall not regret, if it may have assisted in admitting some destitute sick to an earlier participation in the beneficial effects derived from anesthesia by chloroform.

I take 10 parts of commercial chloride of lime of about 90°, mix it carefully with 60 parts of water, transfer the lime-milk which results into a copper still, which should not be filled more than two-thirds, add 2 parts of alcohol of 0.85, and adapt the head and the receiver; when the joints have been well-cemented, a brisk fire is kept under the apparatus. At about 176°, a violent reaction ensues, which raises the mass and would cause it to pass into the receiver if the fire were not quickly removed; this is the only difficult part of the operation. Its approach is indicated by the temperature of the neck of the still. When this has become much heated at its most distant end, before any products of distillation have begun to appear the firing is removed. A few moments afterwards distillation begins, and proceeds rapidly of itself until almost complete. As soon as I observe the action to become slow, I restore the firing to assist it. It is very soon terminated, which is easily known from the liquids which pass over no longer possessing the sweet taste of chloroform. The distillate is composed of two strata; the lower one is dense and slightly yellowish; it consists of chloroform mixed with alcohol and contaminated with a little chlorine; the upper stratum is a mixture of water, alcohol and chloroform, and in the course of twenty-four hours deposits a quantity of the latter product.

The chloroform is separated by decantation, agitated with water to wash it, and then with a weak solution of carbonate of soda to remove the chlorine; it is then rectified over chloride of calcium in the water-bath. For medical purposes I have considered it quite superfluous to admit it to a further rectification over sulphuric acid. The upper stratum of the product from the distillation, and the waters used in washing are united, diluted with more water, and distilled in the water-bath. The chloroform soon passes over, carrying with it a little water and spirit. It is purified as above described.

The principal difficulty in the preparation of chloroform is the necessity of working with very dilute chloride of lime, from fear of other bodies originating, especially of acetic products, which it would be almost impossible to separate. Hence the necessity of operating in vessels of large dimensions, although working with very small quantities of alcohol. It must moreover be remembered that chloroform appears to be only a secondary product. In the violent reaction which ensues between the hypochlorite of lime and alcohol, there is always much less obtained than theory would lead us to expect. Fortunately each operation occupies but little time, and several distillations may be made one after the other in the course of a day.

My first efforts were restricted to determine the most advantageous proportions of chloride of lime, water and alcohol. I have likewise made some experiments to ascertain the influence of a longer or shorter contact, and I am induced to think that the operation is the more productive the quicker it is effected. I believe that it is very advantageous to mix the pulverized chloride of lime in hot water, in order that it may more rapidly attain the temperature of 176° , requisite for the production of chloroform.

A great deal of the chloroform sold at first was not sufficiently pure. I may observe, that notwithstanding its apparent fluidity it is very heavy, and this furnishes a ready

method of ascertaining its purity. By mixing equal parts of concentrated sulphuric acid and distilled water, a liquid is obtained, which, on cooling, indicates 40° on the areometer (spec. grav. 1.35.) One drop of chloroform poured into this liquid sinks to the bottom. This is a very simple test and easily practised, which I hope will prevent the sale of chloroform mixed with alcohol.—*Chem. Gaz. from Comptes Rendus.*

ART. XXIII.—ON CHLOROFORM.

BY THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

M. MIALHE, in a communication recently made to the Academy of Sciences of Paris, states as the result of his researches :—

“1. That pure chloroform, applied to the skin or mucous membrane, produces simple redness without cauterization or vesication. It acquires, however, the caustic properties when mixed with a small quantity of absolute alcohol.

“2. That the chloroform used in medical practice which has caused vesication of the lips or nostril, with irritation of the bronchial tubes, could not have been pure. .

“3. That this chloroform contains a certain quantity of anhydrous alcohol. The presence of this liquid in chloroform was suspected by MM. Soubeiran and Gerdy, and it has been demonstrated by analysis. The alcohol may act by combining with and coagulating the albuminous fluids of the body, and thus giving rise to the local effects of irritation.

“Hence, before using chloroform vapour in surgical prac-

tice, it is indispensably necessary to ascertain whether it be pure. M. Mialhe finds that the following is a very delicate test of the presence of alcohol in chloroform :—Place some distilled water in a tube or glass, and drop on it a small quantity of chloroform. The greater part sinks immediately to the bottom of the vessel, owing to its great density (sp. gr. 1.48.) A small quantity floats by repulsion, but may be made to fall in small globules by agitation. If the chloroform be pure, it remains transparent at the bottom of the vessel; but if it contain only a small portion of alcohol, the globules acquire a milky opacity.”

Assuming the whole of the facts to be as stated by M. Mialhe, this test would appear to be a very delicate one, for we have found that some specimens of chloroform, which remained transparent when added to water, acquired a perceptible opalescence if treated in the same way after the addition of one-thousandth part of absolute alcohol, and the effect became marked when the alcohol amounted to one three-hundredth. If rectified spirit be added in small quantity to transparent chloroform, the mixture becomes at once opalescent, although a larger quantity of spirit forms a clear solution; so that when transparent chloroform contains minute quantities of alcohol, it seems probable that the latter is in the anhydrous or nearly anhydrous condition, as stated by Mialhe, and that the milkiness which takes place, on the addition of water, is the consequence of the hydration of the alcohol. This milkiness generally disappears with a slight increase of temperature, the momentary application of a warm hand to the tube containing the mixture being sufficient to render it transparent. It may be inferred from this, that the test which appears to be so delicate at a low temperature would not be equally, if at all, delicate in warm weather.

When chloroform has become milky from contact with water, it immediately reacquires its transparency on shaking it with a little fused chloride of calcium. This effect is not

so readily produced by contact with oil of vitriol; on the contrary, chloroform, previously transparent, becomes opalescent when oil of vitriol is added to it. If the opalescence be ascribed to hydration, the water must, in this case, be taken from the oil of vitriol, which is not probable.

It is difficult to account for the effect ascribed to the presence of minute quantities of alcohol, and, indeed, the subject requires further investigation.

Pyroxylic spirit may be substituted for spirit of wine in making chloroform, and under these circumstances the process, in the first stage of it, is more manageable and less subject to accidents than when alcohol is used. The reaction which takes place on the application of heat is less violent, and is not accompanied by so much frothing and disengagement of gas. Unfortunately, however, the product thus obtained is unfit for medicinal use, as it retains a disagreeable flavour, acquired, probably, from impurities which are always present in pyroxylic spirit.

Some specimens of chloroform which have been offered for sale at a very low price, have evidently been made from pyroxylic spirit, the taste and smell indicating their origin.

The editor of the Medical Times mentions the following among the chemical properties of chloroform:—

“It rapidly evaporates, producing great cold when dropped on the skin. It has neither an acid nor alkaline reaction, but is perfectly neutral when pure. It is easily dissolved by alcohol and ether, but is again separable by water. It readily deoxidizes nitric acid by the aid of a moderate heat: gold is not dissolved by this mixture, hence no hydrochloric acid is formed, and no chlorine is evolved. Chloroform does not dissolve gold, nor does it bleach vegetable colours; hence it contains no free chlorine. Potassium floats in it without decomposing it, and no gas is evolved, (If much alcohol or ether were present, there would be an evolution of hydrogen.) It forms a milky liquid, but does not enter into combination with caustic potash. It gives

an oily-looking stain to paper, easily dissipated by heat; the vapour is not inflammable, but it renders the flame of a wax-candle smoky and carbonaceous, like chlorine. What is commonly sold as chloric ether is a solution of chloroform in alcohol. The alcohol may be detected and separated by water, as in the washing of ether; it may be also detected by potassium; and as chloroform boils at 140° , and alcohol at 172° , it is probable that Dr. Ure's method of detecting pyroxylic spirit in alcohol, by the temperature of ebullition, might be applied to the detection of alcohol in chloroform."

In reference to the administration of the vapour of chloroform, we quote from the *Lancet* the following statements recently made by Dr. Snow, which involve some points worthy of notice.

"Dr. Snow made some remarks respecting chloroform, at a recent meeting of the Westminster Medical Society. He said that this agent, which had been introduced by Dr. Simpson, to be inhaled instead of ether, was preferable to the latter in some respects, although it was impossible that any thing could be more efficient than ether, as it was capable of totally preventing the pain in every operation in which it might be properly applied. He considered that the action of chloroform on the nervous system was identical with that of ether. By regulating the proportion of vapour in the air, he had produced the same effects on animals by both agents; chloroform, however, had the advantage of being less pungent, and, therefore, less care was required in graduating its first admission to the lungs; it was readily inhaled, and produced its effects with great rapidity, and the quantity of it consumed was curiously small when compared with ether. He had administered it on Thursday, in an amputation of the breast performed by Mr. Tatum, at the St. George's Hospital. He gave it with his usual apparatus, the water-bath being 55° , and the quantity of vapour in the air inhaled not more than ten per cent. by

measure, yet the patient was ready for the operation to begin in less than a minute, and it was performed without the least sign of pain, being equal to the best cases of etherization. The patient recovered her consciousness, as might have been expected from narcotism by ether to the same degree, and she was going on well. Only one fluid drachm of the material was used, although about ten fluid drachms of ether would probably have been used in the same operation. He (Dr. Snow) had inhaled it until he became unconscious, and was very sick afterwards, as on the only occasion on which he inhaled ether to the same extent. When the full effects of ether could be induced quickly, there was no preliminary excitement, and as the new agent produced its effects very speedily, excitement previous to insensibility could probably be altogether avoided in its use. The chloroform placed on the table had been given to him by Mr. Bullock, the chemist; it had been rectified from chloride of calcium; he (Dr. Snow) found its boiling point to be 140° ; he was not aware that the elastic force of its vapour, at other temperatures, had been ascertained; but, from some experiments that he had made, it seemed to follow a ratio very similar to those for ether-vapour and vapour of water; he had ascertained the quantity of vapour of chloroform that air would hold in solution, at various temperatures, and it was shown in a table, of which the following is a copy.

Quantity that 100 cubic inches of air will take up.

Temp.						Cubic inches.
50°	-	-	-	-	-	9
55°	-	-	-	-	-	11
60°	-	-	-	-	-	14
65°	-	-	-	-	-	19
70°	-	-	-	-	-	24
75°	-	-	-	-	-	29
80°	-	-	-	-	-	36
85°	-	-	-	-	-	44
90°	-	-	-	-	-	55

The quantity of this vapour in the air the patient inhaled, at ordinary temperatures, was only about a quarter as much by measure as there would be of ether—being, however, nearly twice as heavy; there was nearly half as much by weight. Now, on account of the small space it occupied, it only excluded the air to a quarter the amount that ether-vapour did, and therefore interfered but little with the natural process of respiration; the patient, indeed, could take in nearly the usual amount of oxygen without quickening or enlarging the respiratory movements. It was to be observed that temperature exerted a great influence over the quantity of this vapour that air would take up, and thus an elevation of little more than fifteen degrees in the warmth of the apartment, would double the amount of it which the patient would inhale in a given time, if no means were taken to regulate the evaporation. Dr. Simpson recommended the chloroform to be inhaled from a sponge or handkerchief, and this simple means was efficient; but he (Dr. Snow) preferred to use an apparatus, as, without it, more of the vapour was blown away by the warm breath of the patient, than was inhaled. The strength of the vapour could not be regulated; it could not even be known when it was all expended, and no exact observations could be collected. The chloroform was of easier application than ether, on account of its quicker action; but, for the same reason, greater care was required in its use, to avoid accident.”

In conclusion, it may be well to repeat, what has already been stated, that chloroform differs from the liquids sold under the names of *chloric ether* and *terchloride of carbon*, inasmuch as these last-named substances are solutions of chloroform in spirits of wine, and the processes originally given for the preparation of these would be inapplicable for the preparation of chloroform.

Chloric ether and *terchloride of carbon* are subject to much greater variations in quality and composition than chloroform is. There are no recognized standards by

which the strength of these compounds may be estimated. Some specimens contain only five or six per cent. of chloroform, while others contain sixteen or eighteen per cent. The latter may be considered the composition of good chloric ether, and this quantity ought to separate from the spirit, forming a dense stratum at the bottom, when the chloric ether is mixed with twice its volume of water. The separation should be effected in a graduated tube, and the mixture well shaken together to insure the complete removal of the spirit by the water, the mouth of the tube being at the same time closed with a cork, to prevent evaporation of the chloroform.

Chloric ether has been used for many years, and is strongly recommended by some medical men as a valuable diffusible stimulant when administered in doses of half a drachm or a drachm. It is worthy of trial as a remedy for cholera. As the chloroform, the active constituent of this so-called ether, is separated and rendered insoluble on admixture with water or aqueous liquors, it seems desirable to point out a convenient form for its administration. Cases have occurred in which a patient has been intoxicated by the last dose of a mixture containing chloric ether, the chloroform having separated and collected at the bottom of the bottle, and having been consequently administered almost exclusively in this dose.

Mr. Morson, who has had much experience in the preparation and administration of chloric ether, recommends the following as the best method of administering it:—

℞ Chloric ether, ʒvj.
Syrup, ʒss.
The yolk of an egg.
Distilled water, ʒivss.

Rub the yolk of egg with the syrup, then add the chloric ether and the water, mixing them together to form an emulsion. The chloroform is held in suspension in this mixture, so that the evil above alluded to would be obviated.—*Pharm. Journ.*

ART. XXIV.—OBSERVATIONS ON THE PREPARATION OF THE OXIDE OF GOLD, (AURIC ACID.)

BY L. FIGUIER.

THE oxide of gold is at present extensively used in the arts, owing to its substitution for the cyanide of gold in the liquids employed in electro-gilding. This has induced me to determine by comparative experiments which of the processes employed for the preparation of this oxide is that which offers the greatest advantages. Three processes have been described. The first, proposed by J. Pelletier, consists in treating a solution of the chloride of gold with calcined magnesia, and subsequently decomposing the aurate of magnesia thus formed with dilute nitric acid. The second process, which I have described in my memoir on the oxides of gold, consists in decomposing a solution of chloride of gold with carbonate of soda and boiling. The amount of carbonate of soda should accurately suffice to saturate the acid without the liquid acquiring an alkaline reaction. In the third process, which I have recently proposed, the oxide of gold is obtained by treating in the cold, a solution of chloride of gold with chloride of barium to which some caustic potash has been added. A precipitate of aurate of baryta is formed, which is decomposed with nitric acid.

With a view of comparing these three processes, I have determined the quantity of oxide which each is capable of yielding with the same weight of gold. 10 grms. of gold furnished by Pelletier's process 9.08 grms. oxide, well dried by long exposure to the air. With carbonate of soda 10 grms. of gold yielded 10.48 of oxide; and the same quantity of metal, treated with chloride of barium and potash, gave 11.72 oxide. This last process is consequently the most advantageous as regards the amount of product, but it is

likewise that which yields the purest oxide. The oxide of gold obtained by carbonate of soda retains a certain quantity of alkaline carbonate, which cannot be removed by washing. On decomposing a little of the oxide by heat, and exhausting the gold with hydrochloric acid, the liquid leaves on evaporation a residue of chloride of sodium, while the oxide prepared with chloride of barium affords no appreciable residue when treated in the same manner, and the solution is scarcely rendered turbid by sulphuric acid. The process is moreover so rapid and simple of execution, that on this account alone it appears to me preferable to the two others, especially to Pelletier's, which, as is well known, is long and tedious on account of the large bulk of the magnesian precipitate and of the time required for washing. I think it may be useful therefore to describe this new process at some length, especially as the only account of it hitherto published is a brief notice in the new edition of Soubeiran's "*Traité de Pharmacie*":—1 part of gold is dissolved in 4 parts of nitromuriatic acid, the solution evaporated to dryness, redissolved in water, which leaves a slight residue of metallic gold and of protochloride, which is redissolved with a little nitromuriatic acid. This solution is again evaporated to dryness, and redissolved in water. The solution of the chloride of gold, which is thus obtained quite free from acid, is mixed with pure potash (perfectly free from chloride) until it has a strong alkaline reaction upon curcuma-paper. It immediately becomes turbid; the solution is then mixed with chloride of barium, which instantly yields a canary-yellow precipitate of aurate of baryta. The addition of chloride of barium is discontinued when the precipitate begins to appear slightly white, which shows that the whole of the oxide of gold being precipitated, the alkali has begun to act upon the baryta of the chloride of barium. The supernatant liquid is colourless; consequently the metal is almost entirely precipitated from its solution. The aurate of baryta thus

obtained is very heavy, and easily washed by decantation. It is washed until the waters cease to be precipitated by sulphuric acid; the aurate of baryta is then treated with nitric acid diluted with water, which sets the oxide of gold free. It is requisite to heat the liquid to boiling, and to keep it at this temperature for some minutes, in order to decompose the last traces of the baryta salt. On washing by decantation until the water no longer reddens litmus-paper, the oxide is obtained pure.

By whichever process the oxide of gold is obtained, particular attention must be paid to the mode of drying it. The temperature of boiling water, which is sometimes used, frequently reduces a part of it. It may be dried *in vacuo* or under a bell-glass over sulphuric acid; but the most simple plan is to press it between folds of blotting-paper, and to expose it to the air protected from the light.

I may briefly notice, before concluding, the best method of obtaining the gold from the liquids resulting from these operations. The liquids resulting from washing the aurate of baryta must not be mixed with those obtained in washing the oxide. The first contain far more gold. They are concentrated by evaporation, and the baryta precipitated by sulphuric acid; the liquid, after standing, is decanted, and a solution of protosulphate of iron added to it, which precipitates the whole of the gold. The waters derived from washing the oxide are also evaporated and precipitated by sulphuric acid; but they must not be treated immediately with protosulphate of iron, on account of the action which the free nitric acid they contain, exerts upon this salt. After precipitation with sulphuric acid, the liquid is decanted and evaporated to dryness, and the small residue obtained treated with nitromuriatic acid. This solution is evaporated nearly to dryness to expel the nitric acid, then diluted with water, and treated with sulphate of iron.—*Chem. Gaz. from Journ. de Pharm.*

ART. XXV.—ON FLUID CAMPHOR.

BY SIR. J. MURRAY.

I wish to bring before the notice of the Pharmaceutical Society, a *permanent* solution of camphor, which I submitted in my Thesis at Edinburgh to the Faculty of that University in 1838. I have had so many proofs of its superiority over crude camphor, and its ordinary preparations, that I have been induced to bring it out more prominently before the medical profession and the public. The proportions found most beneficial during twenty years' experience are three grains of camphor and six grains of bicarbonate of magnesia to each ounce of the fluid. The magnesia is shown by boiling the liquor, the camphor by saturating a glass of the solution with muriate of soda or any dry salt. By thus abstracting part of the water, the camphor is set free, and rises in flakes, like snow, forming a frost-work crust on the surface.

This is a homely experiment, but it is more speedy at a meeting or lecture than more elaborate analysis. The specific gravity of the fluid camphor is 10.026, water being 10,000. The very moderate proportion of magnesia does not interfere with the virtues of the camphor; but on the contrary, by neutralizing gastric acids, the properties of the camphor are more favourably displayed. This has been particularly observed during the present low fevers and bowel complaints, when the fluid was used alone, or as the vehicle for laudanum, tonics, or astringents.

Perhaps a few remarks may be allowed respecting the *remedial agency* of fluid camphor. It has undoubtedly succeeded in soothing and composing the nerves, in cases where solid camphor irritated and disturbed them.

When exhibited in powder, pill, or bolus, or, what is

nearly as bad, in stimulating tinctures, the camphor acts as a local acrid, inflicting pungent pain of the mucous membrane lining the alimentary passages.

The modes of administering camphor having remained almost without any improvement since the days of the Arabian writers, caused great diversity of opinion, not only as to its medicinal qualities, but also its proper doses.

Further, its action being transitory, part of its influence passed away from its usual formulæ before the whole drug became dissolved or absorbable in the stomach; an evanescent medicine should be taken in such a ready and available state, that its entire agency may be promptly brought to bear, without waiting for the uncertain or partial delay of digestion in the stomach.

It is needless to occupy time by further observations, it being more desirable to obtain than to offer opinion; but it may be remarked that whatever character camphor has enjoyed for many ages, its true medicinal value must be greatly enhanced, when administered in a certain, fixed, uniform and elegant manner, rather than the unpleasant and uncertain methods hitherto in use.—*Pharm. Journ.*

ART. XXVI.—ON MURIATE OF OPIUM.

By J. G. NICHOL, M. D., OF CROOK, DURHAM.

DURING the last ten or twelve years I have made and prescribed a solution of opium, which I think is not mentioned in any work on Materia Medica with which I am acquainted. I use powdered Turkey opium and water, pretty strongly acidulated with muriatic acid. I have found, by experience, that this is the best anodyne I am acquainted with. I see, by Dr. Pereira's Materia Medica, that mention is made of Dr. Porter's solution of opium in citric acid. I made and used the same sort of preparation ten years ago; but it did not answer. It caused a great deal of headache, and other unpleasant symptoms; moreover, it became muddy, and appeared to be decomposed; therefore, I gave up using it. I have called this preparation of mine Muriate of Opium, but perhaps it is not a very correct name. I may mention that I prepared solutions of opium with acetic, nitric, sulphuric, citric, tartaric, and muriatic acids, and also prescribed them, but the muriatic solution was vastly superior to any one in every respect. All of them produced *headache* with the exception of the *muriatic*. I prefer muriate of opium to the tincture, wine, or powder of opium, and also to the muriate and acetate of morphia; in fact, to any other preparation of opium. It never makes my headache, but all the other preparations do.

My preparation is made according to the following formula:—

Take of The best powdered Opium, ʒj.
 Muriatic Acid, ʒj.
 Distilled Water, ʒxxx. Mix.

Shake this mixture very frequently every day, during fourteen days, then strain and filter. The dose is from

twenty to forty drops, according to circumstances. Many of my medical friends have tried this preparation, and they highly approve of it. I have taken the liberty of sending you a small quantity as a specimen.—*Ibid.*

ART. XXVII—ON THE VALUE IN ABSOLUTE ALCOHOL OF SPIRITS OF DIFFERENT SPECIFIC GRAVITIES.

BY GEORGE FOWNES, F. R. S.

HAVING been for some months past occupied with experiments on the fermentation of sugar and molasses, and having found it necessary to construct for the purpose a new table of the quantity per centum by weight of absolute alcohol contained in spirits of different specific gravities, I venture to lay the same before the Royal Society, hoping that it may be found generally useful in inquiries of this kind, and also for other purposes.

The table was formed synthetically; absolute alcohol and distilled water were weighed out in the required proportions, mixed in small, well-stopped bottles, and well shaken together. After standing three or four days, the mixtures were brought to the temperature of 60° Fahr. exactly, and their specific gravities determined with great care. After the lapse of two or three days more, this last named operation was repeated, but in no case was it observed that any further contraction had occurred. Neither was the specific gravity of a mixture, containing nearly equal parts alcohol and water which had been so examined, changed by being enclosed in a strong, accurately stop-

pered bottle, and heated for some time to a temperature above its boiling point.

In this manner, each alternate number in the table (each even number) was obtained by direct experiment; the others were then interpolated. When completed, the table was examined by various methods calculated to test its accuracy, but no error of sufficient magnitude to limit its usefulness was detected.

The absolute alcohol employed in these experiments was prepared in the following manner:—the strongest rectified spirit was agitated with half its weight of carbonate of potash, deprived of water of crystallization, and left in contact with the salt some days. It was then decanted upon half its weight of powdered quicklime, made from black marble, contained in a metal still, which could be perfectly closed. The mixture of spirit and lime was retained in a warm situation for a week or thereabouts, and then distilled by means of a water-bath. By this treatment the specific gravity of the alcohol was generally reduced to .796, or even below, and by a repetition of the process of digestion with powdered lime and re-distillation, the last traces of water were removed. In this manner, without difficulty, the very considerable quantity of absolute alcohol required for the experiments was procured.

Absolute alcohol thus obtained, has the specific gravity .7938 at 60° Fahr.; it is extremely expansible by heat, which renders the determination of its exact specific gravity difficult and troublesome when the temperature of the room is either above or below 60°. The same remark applies to the mixtures of alcohol and water extending over more than half the table, the most minute precautions regarding temperature being necessary to avoid serious errors. In a glass retort, containing pieces of copper foil, absolute alcohol boils at 177° Fahr., the barometer standing at 29.75 inches. Lastly, when analysed by combustion with oxide

110 VALUE IN ABSOLUTE ALCOHOL OF SPIRITS.

of copper, it yields numbers representing the proportions of carbon and hydrogen present, so closely agreeing with those required by theory, as to leave no doubt of its purity and freedom from all admixture.

Specific gravity.	Per-centage of alcohol.	Specific gravity.	Per-centage of alcohol.	Specific gravity.	Per-centage of alcohol.
.9991	0.5	.9511	34	.8769	68
.9981	1	.9490	35	.8745	69
.9965	2	.9470	36	.8721	70
.9947	3	.9452	37	.8696	71
.9930	4	.9434	38	.8672	72
.9914	5	.9416	39	.8649	73
.9898	6	.9396	40	.8625	74
.9884	7	.9376	41	.8603	75
.9869	8	.9356	42	.8581	76
.9855	9	.9335	43	.8557	77
.9841	10	.9314	44	.8533	78
.9828	11	.9292	45	.8508	79
.9815	12	.9270	46	.8483	80
.9802	13	.9249	47	.8459	81
.9789	14	.9228	48	.8434	82
.9778	15	.9206	49	.8408	83
.9766	16	.9184	50	.8382	84
.9753	17	.9160	51	.8357	85
.9741	18	.9135	52	.8331	86
.9728	19	.9113	53	.8305	87
.9716	20	.9090	54	.8279	88
.9704	21	.9069	55	.8254	89
.9691	22	.9047	56	.8228	90
.9678	23	.9025	57	.8199	91
.9665	24	.9001	58	.8172	92
.9652	25	.8979	59	.8145	93
.9638	26	.8956	60	.8118	94
.9623	27	.8932	61	.8089	95
.9609	28	.8908	62	.8061	96
.9593	29	.8886	63	.8031	97
.9578	30	.8863	64	.8001	98
.9560	31	.8840	65	.7969	99
.9544	32	.8816	66	.7938	100
.9528	33	.8793	67		

ART. XXVIII.—PATENT GRANTED TO PAUL GILBERT PRELIER, FOR IMPROVEMENTS IN THE MANUFACTURE OF DRY SULPHURIC ACID AND NORDHAUSEN SULPHURIC ACID.

THE patentee commences his specification, by stating that, in consequence of the great affinity of sulphuric acid for water, it is difficult to concentrate the acid even to 66° B.; therefore, in order to obtain dry sulphuric acid, he combines simple sulphates with a fresh proportion of acid for the purpose of forming bisulphates, which he decomposes by the action of heat, and thus obtains dry sulphuric acid. The manufacture of dry acid naturally leads to the production of smoking or Nordhausen sulphuric acid, as the latter is formed by the addition of dry acid to sulphuric acid which has been concentrated to 66° , the specific gravity of the Nordhausen acid increasing with the quantity of dry acid added.

In carrying out the invention, the patentee prefers to employ 100 parts sulphate of soda, 2 parts sulphate of potash, and 2 parts sulphate of lime; but these proportions may be varied; and even if sulphate of soda alone be employed, dry sulphuric acid will be obtained. The mixture is put into freestone retorts, set in a suitable furnace; then, by means of a bent glass tube, the acid is introduced into the retorts, and heat is gradually applied. Shortly after the application of heat, drops of water will proceed from the retorts, then acidulated water, followed by acid at 40° , 50° , and 66° , and finally by acid which fumes or smokes. To enable the operator to judge correctly as to the progress of the operation, vessels containing water are placed to receive the drops of acid; and when each drop produces a sound resembling that which would result if a red-hot iron was

immersed in the water, the acid that produces the noise is dry acid. Vessels to receive the acid are now placed below the retorts, and luted with clay; and the retorts are subjected to a strong heat until the acid ceases to drop into the vessels. Dry acid is thus obtained; but if it be desired to obtain Nordhausen sulphuric acid, a quantity of acid, concentrated to 66° , must be introduced into the receiving vessels, when they are placed below the retorts; and by the admission of the dry acid the density of the acid in the receiver will be increased to 67° , 68° , and 69° , according to the quantity of dry acid that enters the receiver. By this means sulphuric acid is obtained perfectly clear, and never coloured like the Nordhausen sulphuric acid, nor charged with earth or other foreign matters.—*Chem. Gaz.*

ART. XXIX.—ON THE CONVERSION OF TANNIC INTO
GALLIC ACID.

By C. WETHERILL.

THE following experiments were made with a view to ascertain whether a substance is contained in tannic acid which constitutes this acid when conjoined with gallic acid. The author is led from his investigation to regard tannic as isomeric with gallic acid dried at 212° , and to derive the latter from it by the fixation of water. The tannic acid used in the experiments was prepared according to Pelouze's method, and was purified by solution in spirit, and subsequently in water. It was white, and was perfectly precipitated from its solution in water by sulphate of quinine, so that the liquid filtered from the precipitate was

no longer coloured by persalts of iron. Of the different substances examined, sulphuric acid appeared to effect the conversion of the tannic acid best. If 50 grms. of dry tannic acid are heated to boiling in a mixture consisting of 100 cubic centimetres sulphuric acid of 1.84 spec. grav. and 400 cubic centimetres water, there will be found in the course of a few days an abundant precipitate of very white gallic acid. Once, on employing this process, the sulphuric acid was removed by means of carbonate of baryta, the liquid filtered, evaporated to dryness, weighed, treated with ether, and again weighed, and the solution acidified with acetic acid, treated with basic acetate of lead. This last precipitate was well washed and decomposed with sulphuretted hydrogen, after which the filtered solution was treated as above. In the first treatment, 12 per cent. of a substance insoluble in ether was obtained, which consisted principally of gallate of baryta, and of 1 to 2 per cent. of a black body, which was probably an impurity in the tannic acid. The precipitated sulphate of lead, and likewise the sulphate of baryta, also parted with gallic acid to nitric acid; but excepting the above mentioned black substance, nothing further could be detected; and it therefore appears that the entire amount of tannic acid was in the above manner converted completely into gallic acid. Lime might be substituted for the baryta with the same result. The maximum quantity of gallic acid obtained amounted to 87.4 per cent. of the tannic acid. In an analysis of tannic acid, the author arrived at the generally admitted formula $C_{18}H^8O^{12}$; it yielded 50.63 carbon, 3.64 hydrogen, and 45.73 oxygen. Wackenroder and Larocque have stated that this conversion may also be effected by ferments, albumen, blood, and a substance capable of fermentation in gall-nuts; and Humfeld found that tannic acid was destroyed without the formation of gallic acid, by the action of oxidising agents, such as manganese, chromic acid, peroxide of mercury, &c. If the results of the analyses of

gallic acid dried at 212° are compared with those of tannic acid, it appears, as above stated, that the former is derived from the latter by the fixation of water. We have—

	Gallic acid according to Pelouze.			Tannic acid.		
Carbon,	49.56	7 =	49.41	50.63	18 =	50.93
Hydrogen,	3.70	3	3.53	3.64	8	3.79
Oxygen,	46.74	5	47.06	45.73	12	45.28

These numbers do not differ much from one another; and if we bear in mind that tannic acid is uncrystallizable, and that a slight impurity of one of the substances is sufficient to produce the above differences, and moreover that tannic acid is bibasic, we may perhaps represent gallic acid by $C^7 H^3 O^5$, and tannic acid by 2 ($C^7 H^3 O^5$) or $C^{14} H^6 O^{10}$. Crystallized gallic acid is then derived from the latter by the assimilation of water.—*Chem. Gaz. from Journ. de Pharm.*

ART. XXX.—ON THE ACTION OF NITRIC ACID UPON BRUCINE.

By S. G. ROSENGARTEN.

GERHARDT asserts that nitrous ether is obtained on treating brucine with nitric acid, while Liebig, on repeating the experiment, obtained a liquid with properties different from those of nitrous ether. Recently Laurent has examined the subject; he operated upon 15 grms. of brucine, and let the gas which was evolved pass over lime, upon which he condensed it by means of a frigorific mixture. In this manner he obtained 1 grm. of a very mobile liquid, lighter

than water, and which possessed the odour of nitrous ether. The liquid was rectified at a temperature which did not exceed 50° , upon which it was submitted to analysis. The analysis afforded 29 per cent. carbon and 6 per cent. hydrogen; nitrous ether contains 32 per cent. C and 6.6 H. Notwithstanding the great difference of 3 per cent. in the amount of carbon, these results nevertheless, in Laurent's opinion, justify the conclusion that the gas evolved in the action of nitric acid upon brucine, at the ordinary temperature, is nitrous ether.

When the action of the nitric acid at the ordinary temperature is terminated, the residue is an orange mass; and Laurent states that he succeeded in crystallizing it. This substance, which Laurent calls *cacotheline*, gave on analysis (the results are not enumerated) numbers which led to the formula $C^{42}H^{22}N^4O^{20}$. When 3 equivs. nitric acid are added to 1 equiv. brucine, and we subtract 1 equiv. nitrous ether and 2 equivs. water, the formula of *cacotheline* remains.

The great difference in the composition of the volatile product from that of nitrous ether rendered a further examination desirable. To obtain the liberated gas, fused brucine was mixed in a small retort with nitric acid of 1.4 spec. grav. in the cold; a violent disengagement of gas resulted, with evolution of heat; red vapours appeared, but in very minute quantity. The gas was first passed through a tube two feet long, filled with hydrate of lime, and then through one of the same length containing chloride of calcium. The gas burnt with a green flame, coloured a solution of iron immediately black, and was absorbed with remarkable ease by concentrated sulphuric acid; the sulphuric acid gradually assumes a beautiful blue colour, which after a time passes into a reddish one.

When a few drops of water were added to the acid, a violent evolution of gas immediately resulted, and red vapours made their appearance, accompanied by the odour

of nitrous acid. From want of ice and the high temperature during the last summer, all attempts to condense the gas were in vain; it was therefore analysed by connecting a long combustion tube with the preceding apparatus. The tube was provided, as usual, with the chloride of calcium and potash apparatus, and filled partly with recently ignited copper turnings, and partly with oxide of copper. Every caution was employed to get rid of hygroscopic moisture. In one experiment, with 10 grms. brucine, the author obtained 0.3167 carbon and 0.0799 hydrogen, which in equivalents is in the relation of 4 : 6.05. In a second experiment with 6 grms. brucine, the relation was found to be as 4 : 6.38. This is far removed from the relative quantity of carbon and hydrogen in the ethers, and it is quite certain that the reaction is not so simple as stated by Laurent and Gerhardt.

A portion of the residue was treated with alcohol; the colour on drying was reddish-yellow, and not at all beautiful. On analysis it afforded—

Carbon	-	-	51.68	51.86
Hydrogen	-	-	5.44	5.51
Nitrogen	-	-	13.58	
Oxygen	-	-	29.30	

Laurent observes that he succeeded in crystallizing this body; but he does not describe by what method. The only method by which I could obtain any considerable quantity in crystals was by dissolving it in water strongly acidified with nitric acid. The cacotheline then crystallized in beautiful yellow laminæ, and on analysis afforded—

$C^{42}H^{22}N^4O^{20}$				
Carbon	-	-	51.57	51.50 51.43
Hydrogen	-	-	4.75	4.80 4.48
Nitrogen	-	-	12.69	.. 11.43
Oxygen	-	-	30.99	.. 32.66

A solution of this substance, mixed with nitrate of ammonia and silver, yields a flocculent precipitate, which is

likewise the case with salts of mercury and lead. The silver salt detonates when heated. The silver was determined in it several times as chloride; the results always differed. The reactions of this body agree with those described by Gerhardt.

By the action of manganese and sulphuric acid upon brucine, a substance was obtained in the aqueous distillate, which possessed a peculiar odour and reduced nitrate of silver in the form of a very beautiful mirror; it was not altered by potash, and was consequently no aldehyde; nor could any formic acid be detected in it.

From the foregoing experiments, although imperfect, it is evident that the gas evolved in the action of nitric acid upon brucine is not pure nitrous ether, and also that the formula of cacotheline cannot be that proposed by Laurent, although with respect to the amount of carbon and hydrogen the analyses agree.—*Chem. Gaz. from Liebig's Annalen.*

ART. XXXI.—ON THE BALSAM OF TOLU AND SOME PRODUCTS OBTAINED FROM IT.

BY E. KOPP.

THE composition of the balsams of Tolu and Peru has been established by the researches of M. Plantamour and by the beautiful investigations of MM. Fremy and Deville. M. Deville also examined the products of the destructive distillation of the balsam of Tolu, and we are indebted to him for the discovery of benzoene and its derivatives, substances analogous to benzine; one of these derivatives,

nitrobenzoene, has been transformed by Muspratt and Hofmann into a remarkable artificial alkaloid, toluidine. My experiments confirm the greater part of the results already obtained. The balsam of Tolu is composed of—

1. A very small quantity of tolene, $C^{10}H^8$ ($C=75$ $H=6.25$.)

2. Free cinnamic acid, $C^{18}H^8 O^4$.

3. A resin very soluble in alcohol, $C^{36}H^{19}O^8$.

4. A resin but little soluble in alcohol, $C^{18}H^{10}O^5$, or rather $C^{36}H^{20}O^{10}$.

1. *Tolene*.—This carburet of hydrogen was prepared exactly according to the method proposed by M. Deville. It is colourless, very fluid, of a pungent and slightly peppery taste, and possesses an odour resembling that of elemi. Its specific gravity at 50° F. is 0.858, and its boiling point between 309° and 320° F. When set aside in an imperfectly closed tube, it gradually becomes resinified and very slightly coloured. M. Deville assigned to it the formula $C^{12}H^9$. My analyses, which differ but little from those of M. Deville, agree better with the formula $C^{10}H^8$, which also corresponds with the boiling point.

2. *Cinnamic Acid*.—The free acid of the balsam of Tolu is cinnamic acid only, as M. Fremy had observed. This fact was proved by analysis and by the conversion of the acid into nitrocinnamic acid, which is but very slightly soluble in cold alcohol, whilst benzoic and nitrobenzoic acids are very soluble in it.

The results obtained by M. Deville probably arise from his having examined the acids obtained by the distillation of the balsam, or extracted by concentrated alkaline solutions. I have proved that under these circumstances the resins of the balsam of Tolu become transformed in such a manner as to give rise to the formation of a large proportion of benzoic acid. The resins, carefully distilled with caustic soda, yield pure benzoine and a carbonaceous residue, containing a considerable quantity of benzoate of soda (the

boiling point of protonitrobenzene is 446° F.) Cinnamic acid, when mixed with concentrated and cold caustic soda, and exposed to a current of chlorine, becomes transformed into chlorocinnamic acid, $C^{18}(H^7 Cl)O^4$. However, if the temperature is high and the reaction violent, the chlorinated oil noticed by Stenhouse is disengaged, and chlorobenzoic acid formed. These two acids resemble each other considerably, but the latter is more soluble in water and alcohol, and the salts crystallize more readily. It is also obtained from benzoic acid, caustic soda and chlorine. Cinnamic acid, when treated with concentrated nitric acid, is at first transformed into nitrocinnamic acid, then into benzoic acid, and finally into nitrobenzoic acid.

Cinnamic and benzoic ethers also become transformed but with more difficulty, into nitrocinnamic and nitrobenzoic ethers. A great portion of the ether is almost always decomposed and the acids set free. Nitrobenzoic æther is solid, colourless, and of an aromatic taste and odour. It crystallizes in beautiful laminæ, belonging to the right prismatic system. Its fusing point is 116° F., and its boiling point 564° . It is easily obtained by subjecting an alcoholic solution of nitrobenzoic acid to a current of muriatic acid. Its formula is $C^{14}(H^4 NO^4)O^3 + C^4 H^5 O = C^{18}H^9 NO^8$. Nitrocinnamic acid, dissolved in an alcoholic solution of sulphuret of ammonium, is reduced with the aid of a slight elevation of temperature. Sulphur is deposited, and two distinct matters are formed, one of which, of a yellow madder colour, belongs to the class of resins, and the second to the class of alkaloids. The latter is solid, colourless, crystallizable in warts, insoluble in water, soluble in alcohol and ether, and forms difficultly crystallizable salts.

Resin a. $C^{36}H^9 O^8$.—This is brown, translucid, brittle when cold, and shining; its powder agglomerates at 59° , and fuses completely at 140° F. Concentrated sulphuric acid colours it purple. When dissolved in caustic potash and exposed to the air, it easily becomes oxidised and

transformed into the resin β . On dry distillation it yields benzoene and benzoic acid. It readily dissolves in alcohol and ether.

Resin β . $C^{18}H^{10}O^5$.—Dull yellowish-brown, neither taste nor smell, slightly fusible, (above 212° F.) but slightly soluble in alcohol and ether; less easily altered than the preceding resin. Sulphuric acid colours it violet-red; caustic potash dissolves it with a brown colour.

The mixture of the two resins, when treated with nitric acid, yields gaseous products, consisting of carbonic acid, nitrous vapours and deutoxide of nitrogen; volatile products, consisting of the hydruret of benzoyle, hydrocyanic and a little benzoic acids; and as a residue, a flaky yellow matter, which consists of benzoic acid, intimately combined with a yellow resinous colouring matter, which prevents it from crystallizing, and accompanies it in all its combinations, even in that with ether. By the action of heat, especially by distillation, the resinous matter is destroyed, and the benzoic acid is obtained in a perfectly pure state; the resin furnishes nearly the third of its weight of benzoic acid.

The constitution of the balsam of Tolu seems very simple.

Originally the balsam is formed by the soft resinous matter $C^{36}H^{19}O^8$, or that which gives rise to it. This resin, under the influence of the air, becomes converted into cinnamic acid and the resin β , $C^{36}H^{50}O^8 + O^2 = C^{18}H^8 O^4 + C^{18}H^{10}O^5 + HO$. We observe, in fact, that in time the balsam of Tolu becomes hardened, and contains a larger quantity of cinnamic acid.

The resin $C^{18}H^{10}O^5$ can of itself easily yield benzoic acid, for $C^{18}H^{10}O^5 = C^{14}H^6 O^4 + 2HO + C^4 H^2$. Perhaps the tolene is derived from the carburetted hydrogen; but it is more probable that it becomes converted into a resinous

colouring matter, or into water and carbonic acid, by the action of oxidizing bodies.*—*Chem. Gaz. from Ann. de Chim. et de Phys.*

ART. XXXII.—IMPROVEMENTS IN THE PROCESS OF
MANUFACTURING GAS.

THE progress of science and the stimulus of competition have been instrumental in effecting so great an improvement in the quality as well as in the economy of gas, that we now receive at the rate of seven shilling a thousand cubit feet, a gas of much greater purity and illuminating power than that which, a few years ago, was supplied at seventeen shillings. There is every reason to believe that further improvements will be effected, as several new companies are in progress of formation, all holding out to the public their respective claims to confidence and support, on the ground of their undertaking to supply a superior article at a reduced price. Among these aspirants we may mention the Western Gas-light Company, whose works are in course of construction at Kensall Green, who undertake to furnish a gas from Cannel coal, possessing an illuminating

*The presence of muriatic acid in the nitric acid singularly promotes the formation of oxalic acid. The resins of benzoin and Tolu do not yield oxalic acid when treated with pure nitric acid. It is obtained however when an impure acid is used. Pure nitric acid gives rise to terebic acid by reacting upon the oil of turpentine, and oxypicric acid, by oxidizing the gum-resins. On employing nitric acid containing a considerable quantity of muriatic acid, we obtain only oxalic acid under the same circumstances.

power 75 per cent. greater than that of ordinary gas, and free from the usual impurities.

The process adopted by the Western Gas Company is that which has recently been patented by Mr. G. H. Palmer. The specification (dated Oct. 17th, 1847,) describes the construction of furnaces said to be calculated to insure an equable temperature with tubes called regenerators, passing through the upper part of the furnaces, by means of which the gas is exposed to a dull red heat during its passage from the retort to the condenser. These regenerators contain a quantity of metallic chippings or loose plates of iron, the object of which is to increase the heated surface over which the crude gas passes. This part of the process is intended to deprive the gas of sulphur and some other impurities, and to increase its bulk and illuminating power. For its further purification it is made to pass through a "mechanical precipitator and cooling apparatus," in which a revolving fan keeps it in constant agitation, and causes the deposition of the tar and naphtha which runs out below. It next passes into "filtering towers," in which jets of liquid ammonia are thrown into it; after which it is introduced into a vessel in contact with steam at a high temperature, with which it is mechanically mixed. The mixture of gas and steam is then introduced into a refrigeratory or condensor, and the operation of steaming and condensing is repeated until all the condensible materials in the gas are separated. In addition to the above manipulation, the gas is also subjected to the usual purification with lime, in which Mr. Palmer describes an improvement, namely, the introduction of a blast of air prior to the removal of the refuse lime from the apparatus. Lastly, the specification describes a process for naphthalizing or denaphthalizing the gas by the introduction of naphtha or fixed oils into an apparatus resembling that which is used for treating the gas with liquid ammonia.

Among other testimony in favour of their process and its result, the directors of the Western Gas Company have furnished the St. Marylebone vestry with a copy of a report from Dr. Leeson, Professor Miller, and Mr. W. J. Hay, who have, on behalf of the Company, inspected a temporary apparatus erected for the purpose at Vauxhall, and analysed the gas.

This report speaks favourably of the process as being efficient, convenient, and free from the effluvia and other nuisances attending gas-works in general.

The gas is described as possessing a greater specific gravity than that of ordinary gas (in the proportion of 632 to 400) and an illuminating power considerably superior, four cubic feet of the patent gas when burnt giving a light equal to seven cubic feet of ordinary gas. It is also stated to be unusually pure, containing no sulphuretted hydrogen, no ammonia, and no carbonic acid. Such are the advantages offered to the public by the new company, and we have no hesitation in saying that if the managers can and will realize all that they have promised, much benefit will arise from the competition.

It must not be understood, however, that the process described in the specification of the patent is altogether a novelty. Mr. Palmer himself, in the year 1818, took out a patent, comprising in principle the main feature of his present process. A similar process was also patented by Mr. Down in 1832, and also, with some unimportant modification, by M. Malam in 1835. We have before us a plan and description of Mr. Malam's regenerators and furnace, which appear to be precisely identical with those described in Mr. Palmer's recent specification. Mr. Grafton took out a similar patent in 1841. The regenerators are condemned by the most experienced gas manufacturers, as it is found that the gas is injured by this additional heating, the increase in volume being effected at the expense of its illuminating power. The mechanical precipitator is in principle equiva-

lent to Lowe's patent scrubber, now used by the Chartered Gas Company. The steaming, condensing, and naphthalizing processes are adopted at the gas-works in Brick Lane, having been patented by Mr. Lowe in 1832. The blast of air claimed by Mr. Palmer was introduced some years ago in Hull by Mr. Malam. The process of naphthalizing gas has long been known and employed. Some years ago, it was described at one of the Friday evening meetings at the Royal Institution. We must therefore throw aside the impression that the advantages of Mr. Palmer's patent are confined to the works of the Western Gas Company, the most important parts of the process being already either employed at other works, or superseded by modifications answering the same purpose.

The chemical certificate must not be received as conclusive evidence of the uniform superiority of the gas to be furnished by the new company, for this certificate states, that "the gas furnished by different companies varies generally in illuminating power, as does that supplied by the same company at different times." It is well known, however, that one of the main difficulties in the manufacture of gas consists in the production of an equable and uniform product, the result being affected by variations in the temperature employed, and by other circumstances connected with the manipulation. The certificate, therefore, may be taken as evidence of the value and purity of a sample of gas produced for the express purpose of examination; further than this no dependence can be placed on it. The illuminating power of gas depends, in a great measure, on the proportion of carbon it contains, and its purity can be effected by various processes well known and often practised. It would be easy for any company to furnish, from ordinary coal, a sample of gas equal in every respect to that above described. It remains to be shown whether any company will continue to bestow the same



care and expense on the manipulation after having gained a footing.

If sanguine reports and tempting promises could be taken as evidence, we might congratulate the public on the birth of a company which throws all its predecessors into the shade. It is styled "The Cardinal and Central Gas Light-Ventilation, Animal Charcoal, and Carbonaceous Manure Company," and is about to shed its light upon the metropolis. Mr. Radley, the engineer, undertakes on behalf of this Company, to supply a "better gas than that of the Western Gas Company, at a maximum of four shillings a thousand cubic feet," and offers to guarantee, if encouraged by the parochial authorities, that "the price for gas, after the lapse of five years, will not exceed three shillings per thousand cubic feet!"

The public advantages of a fair and free competition are universally admitted, and on this ground it would appear desirable at once to encourage the advances of new companies. But in the present instance, it is requisite, as a prudent precaution, to institute a comparison between the respective claims of the several competitors to public *confidence*, before permission is given to any of them to inflict upon the public the inconvenience attending the opening of the ground in every street in which it may be proposed to lay down the pipes. This license certainly ought not to be granted unless with a well-grounded prospect of future benefit.—*Pharm. Journ.*

ART XXXIII.—ON THE GAMBOGE OF THE TENASSERIM PROVINCES.

BY THE REV. F. MASON, A. M.

IN conversation with a distinguished medical officer, and member of the Asiatic Society, I found that he was not at all aware that the Tenasserim provinces produce Gamboge. It has, therefore, occurred to me that a brief notice of the gamboge of these provinces might not be unacceptable to the readers of the Journal, and would contribute its influence to draw attention to the most interesting portion of the British provinces in the east, one that is exceeded by few in the richness and variety of its natural productions.

Three works in my possession describe gamboge each as the product of a different tree; a fourth represents all to be wrong, and a fifth suggests a different plant still. One refers it to *Cambonia gutta*, a plant which, as described by Linnæus, has probably no existence. He described a Ceylon plant, and it is now quite evident, says Dr. Wight, "that the character of the flower and ovary is taken from one specimen, and that of the fruit from a different one, owing to the imperfection of his specimens, and his not being aware that the lobes of the stigma, afford a sure indication of the number of cells of the fruit."

Another refers it to *Garcinia Cambogia*—but Dr. Wight says, that the exudation of this tree is "wholly incapable of forming an emulsion with the wet finger," a statement which the writer knows to be correct. The tree is very common in the Tenasserim provinces, but the bright yellow exudation it produces is certainly not gamboge.

A third refers it to *Stalagmitis cambogioides*; but Dr. Wight remarks, "the juice of this tree differs so very widely in its qualities from good gamboge, that it can never be expected to prove valuable as a pigment."

Dr. Graham has described a Ceylon tree under the name of *Hebradendron cambogioides*, which is said to produce good gamboge, but no gamboge has ever been exported into the English market from Ceylon. Thus it would appear, to use the language of Dr. Wight, "the tree of trees, which produces the gamboge of commerce, is not yet known."

Dr. Helfre, who was employed by government as a scientific naturalist in these provinces, at an expense of thirteen hundred rupees per month, reported, "the gamboge of this country dissolves very little with water, and consequently does not yield that yellow emulsion as the common *guttifera*. It will never serve as a colour, but promises to give a very beautiful varnish. This statement was controverted by a writer in our local periodical at the time, who said he had obtained "fine gamboge of the very best description," from our jungles, in which he was no doubt correct, but he erred when he added that it came from the "true *Stalagmitis cambogioides*." A very small amount of botany would have served to preserve him from falling into this error, for that plant has a quinary arrangement of its flowers, while the arrangement of the flowers of those that produce gamboge in these provinces is quaternary.

The hills that bound the valley of the Tavoy river on both sides from their basis to their summits, abound with a tree which produces a fine gamboge. It is Roxburgh's *Garcinia pictoria*, which he knew produced gamboge, but which he said was liable to fade. As soon as I satisfied myself of the identity of the trees, by an examination of the inflorescence of our plant compared with Roxburgh's description, I coloured a piece of paper, one band with this gamboge, and another with the gamboge of commerce: and subsequently exposed both to the weather equally for more than twelve months, but without being able to discover that one faded any more than the other. South of

the latitude of the mouth of the Tavoy river, and throughout the Province of Morgui, there is found, on the low plains at the foot of the hills, and on the banks of the rivers, almost down to tide waters, another species of *Garcinia*, that also produces good gamboge. I have no doubt but it is the tree from which Dr. Griffiths furnished Dr. Wight with specimens, and which the latter says "I refer doubtfully to Wallich's *G. elliptica*." We will call it then *G. elliptica*, a species which Dr. Wight has on his list of "species imperfectly known." The foliation and female flowers are, however, very well described, and to complete the description, I may add, the male flowers are pedunculated, but the peduncles are short, and they might be characterized as sub-sessile. The anthers, like those of the female flowers, are sessile, depressed or flattened above, and dehiscent circularly. The ripe fruit is globose, and not furrowed. As I send along with this paper specimens of both male and female flowers, any of your botanists will be able to correct me at a glance, if I be in error.

Neither Wallich, Wight, nor Griffiths, appear to have been at all aware that this species produces gamboge. Dr. Wight, in a recent number of his *Neilgherry plants*, says: "Two species of the genus *Garcinia* are known to produce gamboge; most of the others yield a yellow juice, but not gamboge, as it will not mix with water. The species which he has described as producing gamboge, and to which I suppose he refers, are *G. gutta*, *H. cambogioides* (Graham,) and *G. pictoria* (Roxburgh.) That others may be enabled to judge of the character of the gamboge produced by this tree, I have the pleasure to send specimens of its exudation. In its appearance to the eye, and in its properties as a pigment, I have failed to discover the slightest difference between it and the gamboge of commerce. It serves equally well to colour drawings; the Burmese priests often use it to colour their garments, and the Karens to dye their thread. It is also used by the native doctors in medicine, but I

think not extensively. Dr. Lindley, in his new work, the *Vegetable Kingdom*, says, "The best gamboge comes in the form of pipes from Siam, and this is conjectured to be the produce of *Garcinia Cochinchinensis*. As *G. elliptica* is spread over all the Province of Magui, is it not probable that it extends into Siam, and that the Siamese gamboge is the produce, a part at least, of this tree?

There are several other species of *Garcinia* indigenous to the Provinces, but I know of no others producing any thing resembling gamboge, except *G. Cambogia*; the exudation of which, though it will not dissolve in water, dissolves in spirits of turpentine, and forms a very beautiful yellow varnish, for tin and other metallic surfaces.—*Pharm. Journ.*

ART. XXXIV.—THE PROBABLE ACTION OF CHLORINE AS A DISINFECTANT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Had not the paper read by Mr. Smith at our last meeting extended to so great a length, it was my wish to have put a question to the Members as to their opinion of the precise manner in which chlorine acts when it puts in check the spread of infectious miasms.

From all the authorities I have consulted on the subject, I merely gather in effect this statement, that chlorine enters into chemical union with the miasmatic substance, and changes the combination of its elements into compounds of lower organic type, or even into inorganic.

It is everywhere believed by chemists that the matter of infection is highly organized, and though not volatile, that

it may, like the pollen of flowers, remain mechanically suspended in the air. What then is the action which chlorine exerts over this subtle agent?

We are familiar with the effects of chlorine upon such compounds as phosphuretted, sulphuretted, and carburetted hydrogen, the chlorine from its superior affinity uniting with the hydrogen, and leaving the other combustibles to be either oxidized or precipitated in a simple state.

But these gases, though noxious, are not *infectious*, and as the evils in nature are to a greater or less degree self-mitigating, it is doubtful whether even these noxious gases, in the absence of better means, do not occasionally perform a service, not merely by warning us of the presence of more dangerous matter, but by spreading a gaseous mask over its influence. Surrounded by the products of fermentation of their own excretions, it is said that the inferior animals thrive amazingly, as is observable with pigs, and is instanced by the manner of feeding oxen, called "pitting" them. The odours of a cow-shed are also said to be decidedly beneficial to the human subject in a variety of cases. I am not desirous, however, by any means, of advocating a conservatism of the impure gases, but merely wish to remark, that to deodourize the air, is not necessarily the same thing as to disinfect it.

Chlorine can enter into union with a vast many organic bodies, modifying or completely changing their character; *e. g.* by substitution of the radical hydrogen of alcohol, or rather aldehyde, as in chloral, or when it stands in the stead of oxygen, as in the comparison of, anhydrous formic acid, $C_2 H O_3$, and chloroform, $C_2 H Cl_3$. And Mülder mentions a combination of chlorine with such a high compound as proteine, which it precipitates from its solution in the form of white flocculent, nearly insoluble particles, to which the name chloroproteic acid is given. But does chlorine enter into chemical union with those virulent substances it is said to have the power of disinfecting?

According to the most reasonable views, the matter of infection is not merely composed of highly organized atoms, but those atoms are in a transition state, in fact they are a *ferment*. Let us consider, then, what are the means by which we may modify or restrain fermentation. Among the most powerful agents for this purpose are sulphurous acid, salts of mercury, volatile, and particularly empyreumatic oils, most aromatic substances, tobacco smoke, vapour of roasting coffee, and last, but not least, chlorine, iodine, and bromine, to which may be added substances that are the result of fermentation, as alcohol, and possibly sulphuretted, phosphuretted, and carburetted hydrogen (?), carbonic acid and ammonia. In the "quick vinegar process" introduced into Germany by MM. Wageman and Schutzenbach, although a large quantity of alcohol may be wholly transformed into vinegar in less than thirty hours, the merest trace of wood-vinegar present during the fermentation, would entirely put a stop to the process. The complete immunity also from contagion enjoyed by several trades during the great plague of London, such as tobacconists, curriers, tallow chandlers, oilmen, and other oily or greasy businesses, is a well-known proof that many substances as well as chlorine have a very high power of resisting the action of infectious matter, or, in other words, of stopping its fermentation.

From all this it appears most probable that the action of chlorine is twofold; first, decomposing the noxious (not infectious) compounds of hydrogen; and, secondly, (the most important) suspending the fermentative ("catalytic") power of the organized, but perhaps inodorous material that produces infection. If this notion be correct, it would follow that any of the above-named substances would have their advantages as well as chlorine in the work of disinfection. For instance, camphor has long been supposed to have a charm of this sort about it, and probably the incense employed by the Jewish Church, according to their law,

and described by Cruden as a very rich perfume, had reference to sanitary as well as devotional intentions. The use of strong aromatic perfumes was always general in countries much exposed to infectious influence, as we read in the inspired poetry of David, "All thy garments smell of myrrh, aloes, and cassia;" and the practice of embalming the dead (as the etymology of the word imports) had much to do with balsamic and other odorous substances. I mention perfumes more particularly than the other "anticatalytic" agents, because, as a chlorine generator could not very conveniently be carried about the person, perfumes offer an agreeable, and, I suspect, in many cases an equally efficacious antidote with chlorine against the influences of infection.

I remain, sir, your obedient servant,

WILLIAM GALLARD.

ART. XXXV.—ON THE MANUFACTURE OF GAS.

BY ANDREW URE, M. D., F. R. S.

To the Editor of the Pharmaceutical Journal.

THE observations made in your last number, under the head of "Improvements in the Manufacture of Gas," though correct in general, require certain modifications. The great fall in the price of the London gas cannot fairly be ascribed to any considerable recent improvements in the quality or quantity of gas produced from a ton of coals; but is almost entirely due to the economy of the fuel used in decomposing the coal. At one period, not only the whole coke of the decomposed coal in the retorts was expended in

fuel, but also a good deal of fresh coal. By successive improvements, however, in mounting and managing the retorts, our gas companies have finally succeeded in effecting the production of their gas, by the expenditure of from one-third to one-fourth of the coke ; thus reserving for sale from two-thirds to three-fourths of the whole. The main source of profit to the companies at present proceeds, therefore, from the sale of their coke, so that they may, with as much propriety, be styled manufacturers of coke, as of gas.

You have properly animadverted on the little novelty in Mr. Palmer's patent, too little indeed to resist an action at law : but it is surprising that a person who has been so long tampering with gas as Mr. Palmer, should be apparently ignorant of the first principles on which the illuminating power of carburetted hydrogen depends. This subject was fully investigated by the illustrious French chemist, Berthollet, more than forty years ago.

The good gaseous products of the decomposition of coal in retorts are chiefly two, viz., carburetted hydrogen (of the same composition as coal-mine gas) and bi-carburetted hydrogen, called also olefiant gas. The latter contains twice as much carbon as the former, to which it owes its rich illuminating power. Well made coal gas, from good Newcastle coal, contains, in its crude state, from ten to eighteen per cent. of this superior gas ; though a good deal of it is abstracted and lost in some gas-works by injudicious washing ; for olefiant gas is soluble pretty largely in water.

Berthollet demonstrated, that if pure olefiant gas be transmitted through an ignited tube, it is partially decomposed with deposition of charcoal, and becomes a sub-carburetted hydrogen gas. In this way a bright burning gas may be so much impoverished of carbon, as to afford only a blue flame. Nothing, therefore, can be imagined more preposterous than Mr. Palmer's project of improving his manufacture of gas by transmitting it through ignited

tubes. The scheme has been repeatedly attempted by unscientific speculators in various forms, but has been sooner or later abandoned, after occasioning no little injury to the establishment.

Mr. Palmer's other project, of using cannel coal, is quite impracticable in London ; first, from the high price of cannel coal here, and next, from the worthlessness of its coke. The thing has been tried, but was, for these reasons, soon given up. His proposed plan for abstracting sulphur is of a very problematic nature, and may be regarded as at least superfluous, for all the leading gas companies of the metropolis furnish gas well desulphuretted. In fact, Mr. Palmer's patent is merely a collection of the shreds and patches of worn-out projects—a motley group of make-shifts, under the cover of our anti-scientific legislation, which in no other but our own jobbing, law-laden country would be taken under patent protection.—*Pharm. Journ.*

ART. XXXVI.—ON THE PECULIAR CONSTITUENTS OF THE FRUIT OF ANACARDIUM.

BY DR. STEDLER.

THE fruit known by the name of Cashew nuts and noix d'acajou, which appear to have formerly been officinal, but are now no longer met with in commerce, are derived from a tree which occurs in South America and the West Indies, the *Anacardium occidentale*, L., *Cassuvium occidentale*, Lam., which belongs to the family of the *Cassuviæ* and to the Enneandria monogynia of the Linnæan system. They are kidney-shaped, and of a brownish-yellow, somewhat

variegated colour, by which they are easily distinguished from those nuts which are still frequently met with among druggists by the name of Eastern *Anacardium*; the latter are blackish-brown and cordate.

The nut incloses a kernel, which in taste exactly resembles sweet almonds, and contains a sweet fatty oil; the pericarp, which consists of two lamellæ about a line apart from each other, incloses in its intermediate cellular cavities a brown balsam-like substance, which is oily at the ordinary temperature, has a burning acrid taste, and produces inflammation of the skin.

The fruit of *Anacardium* were first examined by Cadet, who found in them gallic acid, and noticed the acidity of the substance contained in the pericarp; but he was not of opinion that it could be employed with success in medicine. They were subsequently examined by De Mattos, who found in the shells, besides the acrid body, which he calls resin, a large quantity of gallic acid, tannin, an extractive substance, a gum-resin, (*gomme d'acajou*) and a green colouring principle. His attention was especially directed to the medicinal action of this resin, but he extolled its properties so extravagantly, that it was apparently soon forgotten. He employed it both externally as a vesicative, and inwardly in doses of 2 grs. as a drastic, and in doses of from a quarter to half a grain as a gentle stimulant. Similar results were obtained by two French physicians, MM. Eindrall and Bully.

To obtain this body, the nuts, freed from the kernels and crushed, were exhausted with ether as long as this removed anything, the ether distilled from the clear solution, and the residue repeatedly washed with water to remove a small quantity of tannic acid which was mixed with it. In this manner a reddish-brown liquid was obtained, which possessed scarcely any smell, and resembled Peruvian balsam; it formed about one-third the weight of the shells. At the ordinary temperature it is of an oily consistence, is very

easily dissolved by ether and by alcohol, and the solutions strongly redden blue litmus-paper. No volatile product was obtained on distilling it with water. When treated with dilute acids, it parts with a small quantity of ammonia. On spontaneous evaporation of the ethereal or alcoholic solution at a low temperature, the residue solidifies to a tissue of ramified crystals of a white colour, from which a reddish oily liquid separates.

It produces upon the tongue at first an astringent taste, and then a burning and reddening. To ascertain its effects upon the skin, I made the following experiment :—A spot of about one square inch upon the lower part of the breast was spread over with the balsam, and a piece of blotting-paper, which had been moistened with it, placed over it. In the course of a quarter of an hour a slight burning was perceptible, which rapidly increased, and appeared to have attained its greatest energy in about half an hour. The skin beneath the paper had become whitish, surrounded by a red circle. As the inflammation ceased and no further inconvenience was felt, the paper was allowed to remain for about three hours. The skin was covered with small vesicles, which increased considerably in size during the night, without however attaining to the size of those usually produced by cantharides plaster. The place was dressed with linen smeared with tallow; it not only healed very slowly, but the after-effects appeared to continue for a very long time; and after an abundant secretion of pus, the wound was from ten to fourteen days in healing.

A second experiment, made with balsam which had been treated with dilute muriatic acid, afforded the same result.

The muriatic extract left on evaporation crystals, which on examination proved to be chloride of ammonium. Since the balsam which had been treated with muriatic acid contained no more nitrogen, it is evident that its effects cannot be ascribed to any nitrogenous organic compound; they are owing to a substance which is oily even at a low

temperature, and forms about 10 per cent. of the mixture, the greater part of which consists of a crystalline substance which has no effect upon the skin. This latter body belongs to the fatty acids, but it is not combined either with the oxide of lipyle or any other body occupying its place. I propose for this fatty acid the name of *anacardic acid*, and for the active constituent that of *cardol*. The balsam, moreover, contains a small quantity of some colouring substances, which appear to result from the decomposition of the cardol, and will be treated of when that substance is described.

Anacardic acid.—To separate the anacardic acid from the cardol, the mixture, extracted with ether and washed with water, is dissolved in from 15 to 20 parts of alcohol, and the solution digested with recently precipitated hydrated oxide of lead, which combines with the acid and the products of decomposition of cardol, which also appear to possess acid properties; the liquid loses its reaction upon blue test-paper and retains the cardol in solution. The precipitate is collected on a filter, and washed with strong alcohol until the drops falling into water no longer produce any turbidness. The lead salt is then mixed with water, decomposed with sulphuret of ammonium, and the solution of anacardate of ammonia decanted from the sediment of sulphuret of lead. The latter is washed once or twice with a little water, and the united liquids decomposed with dilute sulphuric acid, when the anacardic acid separates in soft adherent masses, which soon solidify in the cold. They are repeatedly washed by decantation with cold water and dissolved in alcohol, when in general a little sulphur and sulphuret of lead remain. The moderately concentrated solution, which is still coloured, is mixed with water until a slight permanent turbidness is perceptible, upon which it is heated to boiling, and basic acetate of lead added by drops to it until the colouring substance, along with a considerable quantity of anacardic acid, subsides in the form of

dark oily drops. In the course of twelve hours the liquid is clear and nearly colourless; it is decanted and the residue exhausted with alcohol, which leaves a nearly black lead compound behind, soluble in ether. The alcoholic extract is of a red colour; it is again mixed with water until the appearance of slight opacity, and treated while boiling with basic acetate of lead as before, when dark drops of resin subside. The clear liquid is united to that previously obtained, and the residue, if it appear worth while, treated in the manner described. To remove the last traces of colour, the liquids are boiled for a short time with recently precipitated carbonate of baryta, when in the course of twelve hours a brown stratum is deposited upon the baryta, and the solution of the anacardic acid is perfectly colourless. Carbonate of baryta does not exert this decolourizing property before the treatment with basic acetate of lead.

The clear solution of the anacardic acid is now mixed with strong alcohol, and while boiling precipitated with a neutral alcoholic solution of acetate of lead. The addition of alcohol is requisite to facilitate the washing, as otherwise, instead of forming a white powder, the precipitate is flocculent. This, after washing, is suspended in alcohol, and decomposed with sulphuric acid or sulphuretted hydrogen, when, after removing the alcohol by distillation and mixing with water, the anacardic acid separates as an oily liquid, and as soon as the last traces of alcohol have evaporated spontaneously, solidifies to a crystalline mass. The acid separated with sulphuretted hydrogen crystallizes with greater difficulty, and moreover a peculiar disagreeable odour adheres to it, which even accompanies it in some of the salts, on which account the separation with sulphuric acid deserves the preference.

Anacardic acid forms a white crystalline mass, which melts at 79° F., and is some time before it returns to the crystalline state. It is void of smell, and has a faint aromatic burning taste, but does not blister the skin. It may

be heated to 302° without affording condensible products; but even at 212° it evolves a peculiar odour, without however experiencing any perceptible alteration in weight. At 392° it is decomposed into a very mobile, oily, colourless liquid, which was not further examined. It burns with a bright smoky flame, and produces a greasy stain upon paper. It is heavier than water. On long exposure to the air it deliquesces, and diffuses an odour perfectly similar to a rancid fat; and this occurs more rapidly with the acid separated by sulphuretted hydrogen than with that prepared with sulphuric acid. It dissolves readily in ether and alcohol, and the solutions strongly redden blue litmus-paper.

The crystallized acid afforded on analysis the following results:—

Carbon	75.06	75.02	75.07	44 =	75.04
Hydrogen,	9.17	9.19	9.19	32	9.07
Oxygen	15.77	15.79	15.74	7	15.89

From the analyses of the lead and baryta salts it was evident that 2 atoms of water may be replaced by bases; the formula of the anhydrous acid is consequently $C^{44}H^{30}O_5$, and its atomic weight 4179.68; that of the crystallized acid $C^{44}H^{30}O_5 + 2HO$, and its atomic weight 4404.64.

It forms with bases partly crystalline and partly amorphous, compounds in definite proportions; the neutral salts contain 2 atoms of base; in many salts however only 1 atom of water is exchanged for a base; it has therefore a great tendency to form acid salts.—*Chem. Gaz.*

ART. XXXVII.—CONTRIBUTIONS TO THE CHEMISTRY OF THE VARIETIES OF THE CATECHU.

BY PROF. DELFFS.

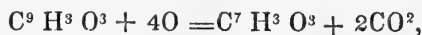
ALONG with the Bengal catechu, which forms dark reddish-brown cakes scattered over with the husks of rice, there now occurs pretty frequently in commerce, the so-called Bombay catechu, in large irregular pieces of a uniform blackish-brown colour and fatty lustre, and which contain leaves of a species of palm disseminated through their mass. As both kinds are derived from *Acacia Catechu*, the difference between them must be owing to the mode of treating them on evaporation; perhaps the last kind has been somewhat burned. The catechu in square pieces has been rejected by the Prussian and also by the Baden Pharmacopœia, as an artificial product, consisting of clay and some astringent extract, while it has been admitted by the Hamburg Pharmacopœia. The author has never been able to discover any considerable amount of alumina in it; moreover the same kind still occurs in commerce, only that the squares are caked together; but it agrees with the old article in its lower specific gravity, ready friability, and sparing solubility in water.

When Bengal catechu is treated in a displacement-apparatus with ordinary ether containing water, and the liquid which passes (which does not separate into two layers, as with galls,) is evaporated under the air-pump, a thick yellow syrup is obtained, and subsequently a brittle, yellowish, shining, amorphous mass of catechu-tannic acid, which tenaciously retains a little of the ether. It readily absorbs so much moisture from the air as to deliquesce into a yellow syrup. Its aqueous solution yields with bichromate of potash a considerable brown precipitate, which does not dissolve in muriatic acid. The alkaline salts of the

catechu-tannic acid exhibit [the same high degree of variability as the corresponding compounds of querci-tannic acid. If an aqueous solution of catechu-tannic acid be exposed to the air in a shallow vessel, decomposition very soon ensues, with the separation of a voluminous fibro-crystalline silky mass, or small acicular needles, which may be obtained perfectly colourless by allowing the hot aqueous solution to cool under the air-pump, and pressing the separated mass between filtering paper. The substance thus obtained is catechuic acid, and exhibits in its behaviour, so great an analogy to gallic acid, that the name catechine may be dispensed with. The composition of the acid is still not accurately determined, as the analyses hitherto made, differ considerably from one another. The substance employed by the author for analysis was dried *in vacuo* over sulphuric acid, and burnt with chromate of lead. It yielded

Carbon,	. .	54.16	54.29	7 =	53.846
Hydrogen,	. .	5.29	5.57	4	5.128
Oxygen,	. .	40.55	40.14	4	41.026

As the salts of catechuic acid are very variable, the determination of the atomic weight does not lead to any certain result. Hagen obtained from the lead compound 62.19 per cent. oxide of lead, which corresponds tolerably well to the formula $C^7 H^3 O^3 + HO$. The formula $C^9 H^4 O^4$ may be deduced from Pelouze's analysis of catechu-tannic acid; we should have therefore



as in the formation of gallic acid from tannic acid.

The so-called Gambia extract yields when pounded but very little to cold water, and appears to be very poor in tannin. It dissolves for the greater part in hot water, and congeals on cooling, to a dirty yellow pasty mass, which behaves exactly like catechuic acid. It is therefore very probable that both drugs are derived from the same plant.

Chem. Gaz., from Journ. für Prakt. Pharm.

ABSTRACT FROM THE MINUTES OF THE PHILADELPHIA
COLLEGE OF PHARMACY.

At a Stated Meeting of the Philadelphia College of Pharmacy, held at their hall, Third month, 27th, 1848. Present seventeen members.

CHARLES ELLIS, 1st Vice President in the Chair.

Since the last meeting of the College, there has been elected by the Board of Trustees, the following gentlemen:

Joseph M. Turner, Savannah, Geo.; Peter V. Coppuck, Mount Holly, N. J.; J. C. C. Hughes, Pottsville, Pa., Associate members.

Alfred B. Taylor, Philadelphia city, Resident member.

The committee on adulteration of drugs, &c., made the following report, which, with the circular published by them, and a letter from Joseph R. Ingersoll, M. C., was read, and the committee continued.

To the Philadelphia College of Pharmacy.

The committee appointed to take into consideration, the adulteration of drugs, respectfully report,

That in accordance with the recommendation of the college, at its special meeting held Eleventh month 1st, 1847, the memorial to Congress then adopted was printed, duly signed by the officers of the college, and forwarded to both branches of the National Legislature, through Joseph R. Ingersoll in the lower House, and Daniel Sturgeon in the Senate. They have received an answer from Joseph R. Ingersoll in relation to the memorial, which informs that he has taken the steps necessary to secure the action of Congress.

The committee further state that they forwarded to each of the chief incorporated medical societies and institutions in

the United States, a circular, and a copy of the memorial, asking their co-operation in bringing about this desirable result.

The Committee not being yet prepared to report in reference to the "directions for detecting adulterations," ask to be continued.

DANIEL B. SMITH,
AMBROSE SMITH,
THOMAS P. JAMES,
EDWARD PARRISH,
CHARLES ELLIS,
JOSEPH CARSON,
WILLIAM PROCTER, Jr.,
Committee.

Third month, 27, 1848.

The Committee appointed on the outstanding debts of members, made the following report, which was accepted, and the Committee continued, to pursue the object of their appointment.

To the Philadelphia College of Pharmacy.

The Committee appointed to assist the Treasurer in the settlement of accounts of delinquent members, report,

That of the eleven members of the College who were in arrears for annual contributions, of some years standing, and whose accounts were placed in their hands for collection, seven have been settled with by a compromise, the committee being induced by circumstances to receive about half the amount due; and four remain unsettled, with only one of whom there is any prospect of coming to terms.

The Committee would call attention to the existing rules of the College on this subject, and would suggest for consideration, whether any further action is necessary in relation to members removing from the city, or retiring from business, whose annual contributions are neglected until they amount to a sum which it is difficult for the College

to collect; and also, whether in the case of delinquent members residing in the city, the contributions should be collected by process of law, or should be compromised by the Treasurer, according to circumstances.

Which is respectfully submitted.

E. PARRISH,

SAMUEL F. TROTH,

Committee.

The Committee on Latin Labels reported progress in the sale of the last edition, and were further continued.

The Committee on Patent Medicine Directions, verbally reported progress, and were further continued. They have purchased and liquidated two shares of the Loan, from the profits of the concern since their appointment.

The Committee on the Cabinet of Specimens, made a report which was read and adopted. In accordance with the suggestion therein contained, a committee consisting of Charles Ellis, Samuel F. Troth, Edward Parrish, John C. Allen, and Professors Carson, Procter, and Bridges was appointed. The sum of fifty dollars was also appropriated to their use.

To the Philadelphia College of Pharmacy.

The Committee appointed at the last meeting, relative to establishing a cabinet, &c., report.

That they have given attention to the subject, by calling on members of the College who are manufacturers, druggists, &c., and found them willing to contribute toward the collection of such products or drugs as the committee may select, the amount of the donation being at the option of the donor. The committee believe from the liberal manner in which their application has been received, that the work will progress rapidly after the proper action has been extended by the College, at least in reference to substances in common use. In regard to the cases for the reception of the specimens, it is proposed to locate them in the Library

room, on the east side, to correspond as near as may be with the book cases, in height and style, and constructed in sections extending from the door to the south wall.

The reasons for proposing this location, are that the specimens will be convenient for examination at our scientific meetings; that they will be ornamental rather than not, to the room itself, and especially, because the absence of day light from the room for the chief portion of the time, will tend greatly to the preservation of the specimens of vegetable origin.

It is proposed that all substances at all perishable by exposure, and especially those which will not require to be removed from the containing vessel, be placed in glass bottles or jars, capable of being securely stopped; that others may be kept in earthen jars, also protected from the air, and as few as possible be placed in a manner exposed to the atmospheric changes.

As the object is a permanent collection, worthy of the College, it should be placed under the superintendence of the Standing Committee on the cabinet and apparatus, who should be required to report annually to the March meeting of the College, in a well digested form, suitable for publication in the minutes; giving the condition of the collection, the donations received, and recommending such action as they may deem important to its advantage.

The Committee therefore recommend that a committee of four members, including the three professors, be appointed to carry out the design, with authority to draw on the Treasurer for fifty dollars, and report at the next meeting.

DANIEL B. SMITH,

CHARLES ELLIS,

WILLIAM PROCTER, JR.,

JOSEPH CARSON,

ROBERT BRIDGES,

Committee.

The Board of Trustees submitted some proposed rules for the government of professional conduct, which were read and referred to an adjourned meeting of the College, to be held on the evening of 31st inst.

A report was submitted by the Publishing Committee, which was read and accepted.

During the past year the Committee have received for subscriptions, &c., \$1034.80, and expended during the same period, \$688.61, including \$50 paid by order of the College to the Finance Committee, leaving a balance in favour of the Journal, of \$346.23.

This being the usual time for electing officers of the institution, Wm. J. Jenks, and D. S. Jones, were appointed tellers, who reported that the following named members had received a majority of votes, whereupon they were declared duly elected.

President.

Daniel B. Smith.

1st Vice President.

Charles Ellis.

2d Vice President.

Samuel F. Troth.

Secretary.

Dillwyn Parrish.

Treasurer.

Joseph C. Turnpenny.

Corresponding Secretary.

William Hodgson, Jr.

Trustees.

Warder Morris,

Joseph Carson,

Robert Bridges,

Wm. Procter, jr.,

John H. Ecky,

Edward Parrish,

Wm. P. Troth,

Benj. R. Smith.

Publishing Committee.

Robert Bridges,	Daniel B. Smith,
Wm. Procter, jr.,	Edward Parrish,
Charles Ellis.	

Then adjourned till 31st inst.

At an Adjourned Meeting of the College, held at the Hall on the evening of Third month, 31st, 1848. Present twenty-four members.

The President in the Chair.

The Code of Ethics referred from the last meeting, was again taken up, read by paragraphs, and after a discussion in which sundry amendments were made, was unanimously adopted.

Some conversation ensued upon subjects embraced in the Code of Ethics, more particularly in relation to the improper use of anodynes and stimulants, and the duty of apothecaries and physicians in endeavouring to check the evil, and also the importance of a correct phraseology, and more precision in the writing of physicians' prescriptions.

On motion it was ordered, that the Code of Ethics just adopted, be signed by the officers of the College, and published in the Journal of Pharmacy, and that a committee be appointed to transmit a copy to the College of Physicians and other incorporated medical bodies in this city, and take such other measures for its circulation as they may deem expedient, and that said committee be authorized to communicate with the College of Physicians on other matters connected with the interests of both professions.

The following members were appointed on the committee; Daniel B. Smith, Henry C. Blair, Dillwyn Parrish, William Procter, Jr., Samuel F. Troth, Dr. Joseph Carson, and Thomas P. James.

Then adjourned.

Extracted from the Minutes,

DILLWYN PARRISH, Secretary.

A CODE OF ETHICS ADOPTED BY THE PHILADELPHIA
COLLEGE OF PHARMACY.

Pharmacy being a profession which demands knowledge, skill, and integrity on the part of those engaged in it, and being associated with the medical profession in the responsible duties of preserving the public health, and dispensing the useful though often dangerous agents adapted to the cure of disease, its members should be united on some general principles to be observed in their several relations to each other, to the medical profession, and to the public.

The *Philadelphia College of Pharmacy* being a permanent, incorporated institution, embracing amongst its members a large number of respectable and well educated apothecaries, has erected a standard of scientific attainments, which there is a growing disposition on the part of candidates for the profession to reach; and being desirous, that in relation to professional conduct and probity, there should be a corresponding disposition to advance, its members have agreed upon the following principles for the government of their conduct:

1st. *The College of Physicians of Philadelphia* having declared that any connection with, or monied interest in apothecaries' stores, on the part of physicians, should be discountenanced; *we in like manner consider* that an apothecary being engaged in furthering the interests of any particular physician, to the prejudice of other reputable members of the medical profession, or allowing any physician a percentage or commission on his prescriptions, as unjust toward that profession and injurious to the public.

2d. As the diagnosis and treatment of disease belongs to the province of a distinct profession, and as a pharmaceutical education does not qualify the graduate for these responsible offices: we should, where it is practicable, refer applicants for medical aid to a regular physician.

3d. As the practice of Pharmacy can only become uniform, by an open and candid intercourse being kept up between apothecaries, which will lead them to discountenance the use of secret formulæ, and promote the general use and knowledge of good practice, and as this College considers that any discovery which is useful in alleviating human suffering, or in restoring the diseased to health, should be made public for the good of humanity and the general advancement of the healing art,—no member of this College should originate or prepare a medicine, the composition of which is concealed from other members, or from regular physicians.

Whilst the College does not at present feel authorized to require its members to abandon the sale of secret or quack medicines, they earnestly recommend the propriety of discouraging their employment, when called upon for an opinion as to their merits.

4th. The apothecary should be remunerated by the public for his knowledge and skill, and in his charges should be regulated by the time consumed in preparation, as well as by the value of the article sold; although location and other circumstances necessarily affect the rate of charges at different establishments, no apothecary should intentionally undersell his neighbours with a view to their injury.

5th. As medical men occasionally commit errors in the phraseology of their prescriptions, which may or may not involve ill consequences to the patient if dispensed, and be injurious to the character of the practitioner; it is held to be the duty of the apothecary, in such cases, to have the corrections made, if possible, without the knowledge of the patient, so that the physician may be screened from censure. When the errors are of such a character as not to be apparent, without the knowledge of circumstances beyond the reach of the apothecary, we hold him to be blameless in case of ill consequences, the prescription being

his guarantee, the original of which should always be retained by the apothecary.

6th. Apothecaries are likewise liable to commit errors in compounding prescriptions,—*first*, from the imperfect handwriting of the physician ; *secondly*, owing to the various synonyms of drugs in use, and their imperfect abbreviation; *thirdly*, from the confusion which even in the best regulated establishments may sometimes occur, arising from press of business ; and *fourthly*, from deficient knowledge or ability of one or more of the assistants in the shop, or of the proprietor—

We hold that in the first three instances named, it is the duty of the physician to stand between the apothecary and the patient, as far as possible ; and in the last that he should be governed by the circumstances of the case—drawing a distinction between an error made by a younger assistant accidentally engaged, and a case of culpable ignorance or carelessness in the superior.

7th. As the apothecary should be able to distinguish between good and bad drugs, in most cases, and as the substitution of a weak or inert drug for an active one, may, negatively, be productive of serious consequences—we hold that the intentional sale of impure drugs or medicines, from motives of competition, or desire of gain, when pure articles of the same kind may be obtained, is *highly culpable*, and and that it is the duty of every honest apothecary or druggist to expose all such fraudulent acts as may come to his knowledge. But in reference to those drugs which cannot be obtained in a state of purity, he should, as occasion offers, keep physicians informed of their quality, that they may be governed accordingly.

8th. As there are many powerful substances that rank as poisons, which are constantly kept by apothecaries, and prescribed by physicians, and which are only safe in their hands, as arsenious acid, vegetable alkaloids, ergot, cantha-

rides, etc.—we hold that the apothecary is not justified in vending these powerful agents indiscriminately to persons unqualified to administer them, and that a prescription should always be required, except in those cases when the poisons are intended for the destruction of animals or vermin—and in these instances only with the guarantee of a responsible person. And we hold that when there is good reason to believe that the purchaser is habitually using opiates or stimulants to excess, every conscientious apothecary should discourage such practice.

9th. No apprentice to the business of apothecary should be taken for a less term than four years, unless he has already served a portion of that time in an establishment of good character. Apprentices should invariably be entered as matriculants in the school of pharmacy, and commence attendance on its lectures at least two years before the expiration of their term of apprenticeship ; and as the progress of our profession in the scale of scientific attainment must depend mainly upon those who are yet to enter it—it is recommended that those applicants who have had the advantage of a good preliminary education, including the Latin-language, should be preferred.

DANIEL B. SMITH, *President*.

CHARLES ELLIS, *1st Vice President*.

SAMUEL F. TROTH, *2d Vice President*.

Attest, DILLWYN PARRISH, *Secretary*.

COMMENCEMENT.

At the Commencement of the Philadelphia College of Pharmacy, held on the evening of the 4th inst., the degree of *Graduate of Pharmacy* was conferred by the President of the College on the following gentlemen, pupils of this institution, viz :

G. Graves Loudon	thesis on Hydro-Alcoholic Extracts.
T. Curtis C. Hughes	" Uva Ursi.
John R. Lewis	" Podophyllum Peltatum.
Alfred Lafayette Taylor	" { Ung. Hydrarg. Oxid. Rub. et Ung. Gallæ.
Alfred K. Scholl	" Helianthemum Canadense.
N. Spencer Thomas	" Emplastrum Plumbi.
Charles Bullock	" Kalmia Latifolia.
Samuel Lenher	" Gentiana Purpurea.
Charles S. Rush	" Displacement.
Evan T. Ellis	" Extract of Valerian.
James H. Crew	" Apocynum Androsæmifolium.
John R. Andrews	" Leontodon Taraxacum.
Charles A. Santos	" { Euonymus Atropurpureus et Americanus.
Charles M. Wilkins	" Coptis Trifolia.
George T. Wiggan	" Cephalanthus Occidentalis.
John A. Springer	" Eupatorium Perfoliatum.
Charles M. Cornell	" Kino.
Franklin C Hill	" { Pharmacy and Medicine in their relations to each other.
James Laws, Jr.	" Syrups.
Samuel M. Bines	" Lactucarium.
Edmund Pollitt	" Eupatorium Perfoliatum.

The Valedictory Address was delivered by William Procter, Jr., Professor of Pharmacy.

Extracted from the Minutes,

EDWARD PARRISH, Secretary.

MISCELLANY.

Gymnema Sylvestre, an Indian plant, which, when chewed, destroys the power of tasting Sugar.—At a meeting of the Linnæan Society, on Tuesday, December 7th, Dr. Falconer made a communication which he had received from Captain Edgeworth, who was located in the northern part of India. Captain Edgeworth, an acute observer, and one who is actively engaged in prosecuting the study of botany, hearing from the natives that a plant grew in that neighbourhood, which, if chewed, would destroy the power of the tongue to appreciate the taste of sugar, and all saccharine substances, at first thought this an extremely problematical and fanciful statement; but knowing the natives of India to be remarkable for their powers of observation, there being scarcely a plant in the country to which they did not attribute some property, fanciful, but more generally real, he was determined to try the effect of the plant in question. The name of the plant is *Gymnema sylvestre*; nat. ord. *Asclepiadææ*, a native of the plains in the north of India. It has a greenish flower, and thick fleshy leaves, and like most of the plants of this order, it produces a milky juice. Captain Edgeworth chewed some of the leaves, and was surprised at not perceiving the acrid taste of the plants of this order; but about two hours afterwards, when taking some tea, he was greatly surprised to find that although he could fully appreciate the aroma of the tea, he was perfectly unable to appreciate the taste of the sugar. Thinking this to be a very strange circumstance, he obtained some preserves and other substances containing sugar, and upon putting them upon the tongue, he found he was still unable to appreciate the saccharine quality; he then obtained some powdered sugar, and it appeared only like so much sand in his mouth. This effect lasted altogether nearly twenty-four hours, when he recovered the power of tasting sugar. To avoid all chance of error, Mrs. Edgeworth afterwards tried the effect of the plant, and with precisely the same result. Dr. Falconer considered this effect to be an extremely curious one, and he believed that it was the only well authenticated case upon record of such an effect being produced upon the organ of taste, that although it was well known that many substances have the power of

preventing the eye distinguishing certain colours, but none that had the power of destroying the sense of taste for any one particular substance, while it could appreciate others, and might, consequently, lead to some important physiological discovery as regards the organ of taste.—*Phar. Jour.*

On the effect of Coffee in diminishing the bitter taste of Sulphate of Quinine.
By M. QUEVENNE.—Sulphate of quinine is less soluble in an infusion of coffee than in water: this is evidently the cause to which the property possessed by the former liquid, of masking the bitterness of the quinine, must be referred. Besides this the part remaining undissolved at the bottom of the vessel absorbs certain elements of the coffee (amongst others tannin and colouring matter), and becomes still less soluble, not only in an infusion of coffee, but also in pure water. With respect to the practical inferences to be drawn from these observations in a Pharmaceutical point of view, it may be remarked that, besides the necessity already pointed out by M. Dorvault (*Répertoire de Pharmacie*, t. 3, Juin, 1847), of not dissolving the salt of quinine previously in acidulated water, but of putting it in powder in the infusion of coffee, and taking it whilst in a state of suspension; it is better that the coffee should not be very warm when the sulphate of quinine is added, the solvent power of the liquid, and, consequently, the development of the bitter taste, increasing with the temperature. The coffee should not be employed too strong, as that would increase the tendency to the formation of tannate of quinine—a salt less soluble, and, consequently, less active than the sulphate. Nine grains of sulphate of quinine, added to an infusion of two and-a-half drachms of coffee, in three ounces of water, with sugar *ad libitum*, are suitable proportions.

As regards the effect produced on the activity of the sulphate of quinine when thus mixed with coffee, these observations would naturally lead us to inquire how far this diminution of solubility could injure the effect of the medicine. It is evident that, starting with this general principle, uncontrovertible both in physiology and chemistry, that the activity of bodies is increased in proportion as they are dissolved, or readily acted on by the liquids with which they come in contact; and remarking, on the other hand, what has been proved by experiment, that sulphate of quinine, dissolved in acidulated water, acts more promptly and energetically than when in a state of partial solution in pure water, or in pills, we must arrive at the conclusion that the manner of administration, of which we are now treating, is disadvantageous. But, at the same time, sulphate of quinine, being a

medicine almost invariably very decided in its action, we believe, that, in the majority of cases, notwithstanding the disadvantages resulting from its diminished solubility, this discovery will prove useful to invalids, by enabling them to take what to some is a disagreeable medicine, without perceiving the taste. Still, it is right that the physician should be acquainted with these disadvantages, that in obstinate cases he might either increase a little the dose, or rather have recourse to a more favourable mode of administration, namely, solution in acidulated water.—*Ibid*, from *Jour. de Phar.*

On the Preparation of Infusions and Decoctions in Prussia.—The sixth edition of the Prussian Pharmacopœia, directs all extracts and volatile oils, and most of the ointments and plasters, to be prepared by means of a steam apparatus or water-bath.

With regard to this the Prussian Government has recently issued the following regulations :

As the object of the above directions is to obtain more uniform and effective infusions and decoctions, Apothecaries are required to provide themselves with the necessary steam apparatus, and to proceed in the preparation of decoctions, decocto-infusions, and infusions, in the following manner :

The tin or porcelain vessels for decoctions must be so constructed that at least three-fourths of their height may be exposed to steam, which must possess the temperature of boiling water. Part of the vessel may be in direct contact with the boiling water. If the steam be generated in a boiler, its temperature must never be so high as to heat the liquid contained in the vessel to a boiling temperature. The vessels must be furnished with lids of the same material and fitting close.

The same quantity of the substance as prescribed by the Physician, broken or cut into small pieces, is stirred in the decoction vessel with as much cold water as is known by experience to be required for obtaining the prescribed quantity of liquid, and the vessel being well closed, is to be exposed for half-an-hour to the influence of steam, during which time the vessel is to be well shaken several times, and the contents immediately filtered whilst hot. If some other substance is to be added towards the end of the operation, this must be done after the vessel has been exposed to the steam for twenty-five minutes.

Decocto-infusions are prepared by adding to the hot contents of the vessels, the substance to be infused after the decoction has been exposed to the steam for the prescribed time, stirring carefully, closing the vessel, and allowing it to become perfectly cold, after which the contents are to be filtered.

The infusions are prepared in the usual way: boiling water is poured over the well-broken or cut substance, the contents of the vessel stirred up, the latter closed, the liquid allowed to become perfectly cold, and then filtered.

If the Apothecary wishes to employ for the infusions, water which has been heated in a kettle to a boiling temperature by the steam of the apparatus, the vessel must be exposed to the steam for five minutes.

If the quantity of the medicine, and that of the liquid to be obtained from it, are not prescribed by the physician (which ought only to occur in extraordinary cases) one drachm of the substance is taken for every ounce of the decoction or infusion. In order to obtain a *concentrated decoction*, the vessel is to be left for three quarters of an hour to the influence of the steam; and for a *very concentrated decoction*, one hour, without increasing the quantity of the medicine. A *concentrated infusion* is prepared by increasing the substance to be infused by one-half of the prescribed quantity, and a *very concentrated infusion* by doubling it.—*Ibid*, from *Buchner's Repertorium*.

On Oleum Ricini Alcoholicum.—M. August Ostermayer a merchant in Munich, has received from Trieste, and offers for sale a sort of oleum ricini alcoholicum, which is much patronised in Italy. From half-an-ounce to one ounce, according to the age and constitution of the patient, is prescribed with half-an-ounce of *aqua naphæ*, and half-an-ounce of *syrup. cort. aurant*. This oil is said to be less disagreeable to the taste in this form and mixture, and also to operate more effectively than the common ol. ricini obtained by pressure, or boiling with water.

Dr. Buchner gives the following description of it:—the ol. ricini alcohol. is of a very pale yellow oil colour, and somewhat turbid. When left standing, white flakes and some small globules form in it, and which appear to arise from the presence of water. The specific weight is only 0.920, that of common castor oil, according to Brandes, Schübler, and others, being 0.954 to 0.970. It is clear and somewhat thick. The ol. ric. alcohol. possesses a faint smell of alcohol, altogether void of fuselol [oil of grain]; and a not disagreeable oily and alcoholic taste. If taken without syrup and *aqua cort. aurant*. it leaves behind in the throat a slight, rather persistent acrid sensation. The alcohol which it contains is not very strong, but it can easily be ignited, and then it burns with a blueish flame, leaving some particles of water mixed with the oil. To determine the proportion of castor oil, six drachms, or 360 grains of *ol. ricin. alcohol*. were submitted to a temperature of from 167° F. to 212° F., in a porcelain capsule for 48

hours. The residual oil weighed 259 grains, and possessed the same colour and consistency as genuine ol. ricini, only after being swallowed it left the above mentioned acrid sensation in the throat. The result of this experiment is, that the ol. ricini alcohol. contains 72 per cent. of common castor oil, including the drastic part of the latter, and 28 per cent. of alcohol and water.

M. Buchner, who supposes this oil to be an alcoholic extract from castor seeds, made the following experiment: 142 grains of perfectly ripe seeds were carefully peeled, and yielded 98 grains, or 69.01 per cent. of kernels, and 44 grains, or 30.99 per cent. peels. The first were triturated into a paste, and digested with about two drachms of spirit of wine at 90 per cent, at a gentle heat. The oleo-alcoholic extract being removed from the sediment, was much like the ol. ricini alcohol., but paler, and at the same time of a stronger alcoholic taste, which shows that the Italian oil is prepared with a weaker spirit. It was accompanied with the same acrid sensation as the Italian oil. The residue was afterwards distilled twice with larger quantities of alcohol of the same strength, and at last with ether. The exhausted bran dried at 212° Fahr., formed a yellowish white powder, having a mealy taste, and weighed 33.5 grains; the employed seeds, weighed with their shells, yielded accordingly 35.5 per cent. oil, 33.5 per cent. bran, and 31.0 per cent. shells.

Geiger says, he found in castor seeds, besides 46.19 per cent. oil (which also possessed an acrid taste) fecula (amylon?) together with gum and albumen. Buchner, however, convinced himself that the residue freed from oil, consists for the greater part, of emulsin, is not coloured blue by iodine, and contains, therefore, no starch, but sugar; for a very diluted *emulsio ricini* when mixed with washed yeast, undergoes the alcoholic fermentation at a low temperature.—*Ibid*, from *Buchner's Repertorium*.

The Brazil-Nut Tree.—The one of all these most attractive was that which produces the Brazil-nut, called in the country *castanhas*. Botanically it is the *Bertholletia excelsa*. This tree was upwards of 100 feet in height, and between two and three in diameter. From the branches were depending the fruits, large as cocoa-nuts. The shell of these is nearly half an inch in thickness, and contains the triangular nuts, so nicely packed, that once removed no skill can replace them. It is no easy matter to break this tough covering, requiring some instrument and the exercise of considerable strength; yet we were assured by an intelligent friend at the Barra of the Rio Negro that the *Guaribas*, or howling monkeys, are in the habit of breaking them by striking them

upon stones or the limbs of iron-like trees. This friend related an amusing incident of which he had been witness, where the monkey, forgetful of every thing else, pounding down the nut with might and main, in a fervor of excitement, struck it with tremendous force upon the tip of his tail. Down dropped the nut and away flew monkey, bounding and howling fearfully. How long the victim was laid up by his lame tail our friend was unable to inform us; but we thought one thing certain, that monkeys had changed since Goldsmith's day, inasmuch as at that time, as we are informed, the tip of a monkey's tail was so remote from the centre of circulation as to be destitute of feeling. When the castanha-nuts are fresh they much resemble in taste the cocoa-nut, and the white milk, easily expressed, is no bad substitute for milk in coffee. This soon becomes rancid, and at last turns to oil. The nuts are exported largely from Pará, and are said to form a very important ingredient in the manufacture of sperm candles.—*Voyage up the Amazon.*

On the Presence of Alumina in Plants. By PRINCE SALM-HORSTMAR.—Much doubt has lately been thrown on the presence of alumina in plants. Berzelius, however, asserts that it is present in *Lycopodium complanatum* and *Helleborus niger*. This induced the author to investigate its occurrence in these and some other plants.

Some *Lycopodium complanatum*, which had been collected in February, was boiled with distilled water for half an hour, the filtrate evaporated in a platinum dish, the yellow gummy residue incinerated, the ash dissolved in muriatic acid, evaporated to dryness, again dissolved in muriatic acid, filtered, the filtrate treated with muriate of ammonia, then with pure ammonia, the precipitate dissolved in a small quantity of muriatic acid, digested with solution of potash in excess in the platinum dish, and filtered. The filtrate yielded a precipitate of alumina, on the addition of muriate of ammonia.

0.35 grm. of the ash of the green parts of this *Lycopodium* were treated with muriatic acid, no effervescence occurred; the solution was evaporated to dryness in the platinum capsule, and the mass well moistened with muriatic acid; after standing some time it was dissolved in water, filtered, the filtrate treated first with muriate of ammonia, then pure ammonia, the precipitate washed, removed from the filter while moist and dissolved in muriatic acid, treated with excess of caustic potash in a platinum capsule, digested with heat, when the greater part dissolved, it was filtered, the filtrate treated with silicate of potash, and heated to ebullition in a glass vessel, the washed precipitate dissolved while moist in muriatic acid, evaporated to dryness in platinum until the odour of chlorine had disappeared, thoroughly moistened with muriatic acid, treated with water, the

silica separated by filtration, and the filtrate precipitated with carbonate of ammonia; the precipitate, when well washed and heated to redness, weighed 0.135 grm., and consisted of alumina; hence the ash contains 38.5 per cent. of alumina. It acquired a beautiful blue colour when treated before the blowpipe with a solution of nitrate of cobalt.

This ash contained, moreover, 16 per cent. of silica soluble in potash, and only 6 per cent. of lime. The other constituents were magnesia, potash, soda, manganese, iron, phosphoric acid and sulphuric acid, which were not accurately determined. The aqueous solution was not alkaline in reaction. This lycopodium grew upon a yellow, aluminous, sandy heath, which contained only a trace of humus.

0.35 grm. of the ash of *Juniperus communis*, which was growing close to the lycopodium, was tested for silica. The ash was prepared from the summits of the shoots, which were thickly covered with needles. Alumina was decidedly present, but the quantity did not amount to a milligramme. It contained only 2.5 per cent. of silica, but 28.5 per cent. of lime.

Moreover, in 0.5 grm. of the ash of *Erica vulgaris*, which also grew close to the *Lycopodium complanatum*, a small but appreciable quantity of alumina was present with 17 per cent. of silica soluble in solution of potash. The delicate summits of the shoots covered with leaves were the only parts used for this examination.

Alumina was also found in the leaves of *Helleborus niger*, which had grown in a garden soil abounding in humus.

The leaves of the *Pinus sylvestris* contained no trace of the alumina. The tree grew upon a rich sandy soil.

Hence there is no doubt that certain plants contain alumina.

The remarkable circumstance, that the ash of *Lycopodium complanatum* contains more than 38 per cent. of alumina, *Juniperus communis*, growing close to it, a mere trace, whilst many plants, according to recent analyses, contain none, appears to justify the conclusion that the roots of plants containing alumina either exert a peculiar catalytic power upon the aluminous compounds with which they are in contact, or excrete an acid; for were the aluminous constituents of the soil soluble *per se* in the fluids of the soil, they would also be absorbed by other plants.

This consideration induced the author to test the reaction of the roots of *Lycopodium* and *Juniperus*; and he found that the perfectly fresh uninjured smaller roots of *Lycopodium complanatum*, free from the soil, when placed upon moistened litmus-paper, had an acid reaction, whilst the root of *Juniperus communis* did not exert this action.—*Chem. Gaz., from the Journ. für prakt. Chem.*

On some Properties of Carbon. By M. LAZOWSKI.—The properties of carbon are numerous; they have been partly studied, but every day produces new facts: when it is in a state of ignition, it possesses some very remarkable properties.

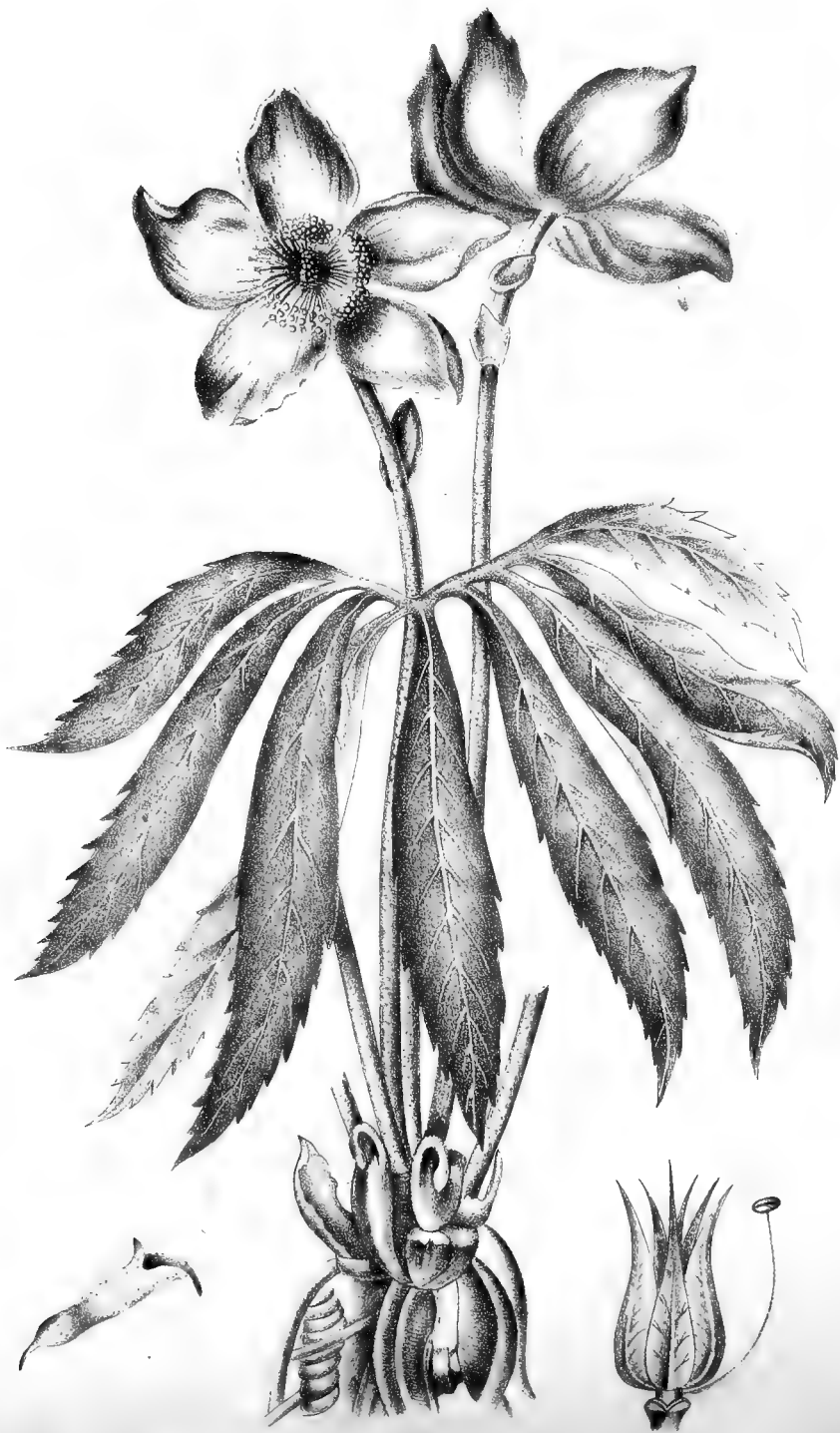
When a piece of ignited charcoal, which is very clean and free from ash, is immersed in a solution of a metallic salt, it reduces the metallic salt which is contained in it, and the metal itself is deposited with all its natural brilliancy on the piece of charcoal. Thus the salts of tin, copper, platina, palladium, mercury, silver and gold, &c., furnish most brilliant deposits.

M. Lazowski has remarked, he says, that when the salts are too acid or too much concentrated, no effect is produced. The dilute solutions of the salts of copper often yield, by covering the charcoal, the most varied shades of colour, from the finest azure blue to that of metallic copper. The parts of the charcoal upon which certain metals are deposited in preference, are the extremities; whilst other metals cover equally all the surface of the reducing body; at other times, and this occurs with the protochloride of tin, the metal appears in very brilliant crystals, disseminated on the periphery of the charcoal.—*Ibid*, from the *Jour. de Chim. Méd.*

Action of Potash upon Amber. By. G. REICH.—When powdered amber is heated to boiling in a retort with a very concentrated aqueous solution of caustic potash, and distilled to dryness, a strong odour of camphor is disengaged, and the receiver contains an aqueous liquid, together with a white substance which possesses all the properties of camphor (stearoptene). This substance must however not be confounded with the succinic camphor of M. Vogel, which is obtained by the destructive distillation of amber, and which has absolutely nothing in common with camphor, as it does not dissolve in water nor in alcohol, and very sparingly in ether.—*Ibid*, from the *Archiv. der Pharm.*

Candied Pills.—Dorvault recommends that pills be coated with gum, by which means they acquire a candied aspect, and present the same advantages as the gilt pills did formerly. After the pills are rolled, they are to be shaken in a spherical box with 1 or 2 drops of simple syrup, so as to render them moist. They are then mixed gradually by shaking with powdered gum, either by itself or with oleo-saccharum, until they cease to take up any more, when they are dried. If it be required to render the coating perfectly transparent, some starch is added to the powdered gum.—*Ibid*, from *Buch. Rep.*





HELLEBORUS NIGER.



ARBORUS NIGER.

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ART. XXXVIII.—ON BLACK HELLEBORE, (HELLEBORUS NIGER.)

BY JOSEPH CARSON, M. D., &c.

HELLEBORUS NIGER. Linnæus.

Nat. System.—*Ranunculi*. Jussieu. *Ranunculaceæ*. De Cand.

Sex. System.—POLYANDRIA, POLYGYNIA.

GEN. CHARACTER.—*Calyx* persistent, of five sepals, roundish, obtuse, large, usually green. Petals eight to ten, very short, tubular, narrow, and nectariferous beneath. *Stamens* thirty to sixty-four. *Ovaries* three to ten. *Stigmas* terminal, orbicular. *Capsules* coriaceous. Seeds in a double row, elliptical, umbilicated. *De Candolle*.

SPECIFIC CHARACTER.—*Rhizoma* black, tuberculated, horizontal, scaly, with many dependent fibres, whitish internally. Leaves all radical, on cylindrical stalks from 4 to 8 inches long; pedate, quite smooth, and almost evergreen, of a strong, firm texture, pale green and shining above, pale, and strongly reticulated beneath; lobes cuneate obovate, entire and unequal at the base, coarsely serrated at the point. *Scape* shorter than the petiole, 1—2 flowered, with ovate lacerated bracts immediately beneath the calyx. *Sepals* 5-ovate or roundish; large, white, slightly tinged with pink, eventually becoming green. *Petals* green, tubular, shorter than the stamens. *Carpels* 6—8, follicular, many seeded. *Lindley*.

Black hellebore is one of the most active of a family containing a number of exceedingly energetic plants. They present sufficient points of alliance to be retained in one class, *Ranunculaceæ*, but yet so much differ as to require

particular study. Generically, the connexion in a chemical and therapeutic point of view is well preserved; thus the principles found in the different species constituting the genus *Helleborus*, are the same, and this is also true as regards medicinal activity. *Aconitum* presents another example of uniformity; the species composing it, however, contain a peculiar active principle, and the effects are unlike those of the hellebores. The genera, indeed, present a marked independence, as is evident on enumerating, in addition to the preceding, *Coptis*, *Delphinium*, *Cimicifuga*, *Ranunculus*, and *Podophyllum*. In the attempt at reconciling the differences by looking to the systematic sub-division into orders, but little success is met with. This is apparent, when it is recollected that the two genera first mentioned belong to the same order *Helleboreæ*, (Lindley.) Harmony in affinities is not so marked in this family as in many others, and we either may require too much from our natural arrangement, or exploration has not been carried sufficiently far to show the links of connection. De Candolle, when tracing the alliances of the *Ranunculaceæ* in 1816, dealt entirely in generalities; to his mind the prominent property was that of acidity, and he appealed to chemistry to show its source; subsequently, energy in the individual medicinal plants of the group has been proved to be dependent on a bitter principle, volatile oil, resin, and an alkaloid. Perhaps some others, now latent, may be detected.

HABITAT.—Black Hellebore is an inhabitant of the mountainous districts of Southern Europe. It is found in Switzerland, France, Spain, and Italy. In consequence of flowering in the middle of winter, and being used as a decoration at the feast of Christmas, it has been called the *Christmas Rose*. Sibthorp found it in Greece, in Laconia, and upon Mt. Athos, (*Flor. Græc.*) Belon noticed it upon Mt. Olympus. (*Dict. de Mat. Med. Merat and De Lens.*)

ROOT.—The fullest account of this portion of the plant is that given by Geiger, in his *Hand-book of Pharmacy*, and

introduced in a note into the last edition, (1845,) of the U. S. Dispensatory, as follows: "It is usually a many-headed root, with a caudex or body half an inch thick or less, seldom thicker, and several inches long, horizontal, sometimes variously contorted, uneven, knotty, with transverse ridges, slightly striated longitudinally, presenting on its upper surface the short remains of the leaf and flower stalks, and thickly beset upon the sides and under surface with fibres of the thickness of a straw, and from six to twelve inches long. These are undivided above, but at the distance of from two to six inches from their origin, are furnished with small, slender branches. The colour of the root is dark-brown, sometimes rather light-brown, dull, and for the most part *exhibiting a grey earthy tinge*. Internally it is whitish, with a somewhat darker pith, which, when cut transversely, shows converging rays. Sometimes it is porous. It has *a medullary or fleshy*, not a ligneous consistence. The fibres, when dried, are wrinkled, very brittle, sometimes greyish internally, with a *white point* in the centre. The odour of the dried root is feeble, somewhat like that of senega, but more nauseous, especially when the root is rubbed with water. The taste is at first sweetish, then nauseously acrid and biting, but not very durable, and slightly bitterish."

It would appear from the books that substitution of other roots for that of the black hellebore does take place; sometimes they are derived from the other species of the *Helleborus*, or they may be from entirely different plants. The root most commonly substituted is that of the *Actæa spicata*. Murray (*Apparat. Medic.*) says that the only root sold in France is that of the *A. spicata*, or *Herb of St. Christopher*. A *false black hellebore* is described by Guibourt, which he says the herborists and druggists obtain from the interior of France. Upon comparing it with the root of the *A. spicata*, derived from the Garden of Plants, he found that the physical characters were the same, the only difference consisted in odour and taste.

A year ago my attention, as well as that of the Messrs. Ellis, of Philadelphia, was directed to a lot of roots which had been sent to them for black hellebore; it was obtained from a German importer. We were at once struck with the general dissimilarity to the genuine drug. Upon further examination, I found that in many of the drug-houses of the city similar roots were mixed with the drug kept as black hellebore; and further, that in an old specimen in the cabinet of the College of Pharmacy, the same admixture was apparent. The research thus prompted, has led to the opinion that the article met with is the root of the *A. spicata*, and for the information of those interested, I shall now fully describe it.

Each root is constituted of the caudex and fibres, with the remains of numerous stalks or stems attached to the caudex. This latter portion is knobby or jointed, horizontal and contorted. The knobs or tubercles are two or three inches long, about the third of an inch in thickness. Their surface is marked by thin annulations, regularly at two lines distance from each other: it is smooth, and of a deep brown colour. The caudex resembles more a subterranean stem than a rhizome. On one side of the caudex and at the extremity are prolongations, the remains of footstalks, half an inch to an inch long, woody and fistulous; on the opposite side are numerous fibres irregularly placed, several inches long, and of a lighter brown or reddish brown colour; each fibre is full, very little corrugated, composed of a cortical substance sometimes cracked transversely and smooth, with a central woody medutillium, presenting, when the fibre is cut transversely, the form of a star or cross with five points. The cortical substance can be separated, and the central cord then exhibits an angulated form. When dry, the fibres are very brittle, the odour is faint but disagreeable, and the taste is bitter.

The points of distinction which we would depend upon

are, the thickness and double-headed form, as well as the sponginess of the candex of the genuine root, in contrast with the diffuse, jointed, ligneous, stem-like character of that of the false; the close set perpendicular position of the fibres of the former, compared with the straggling, separated and horizontal arrangement of those of the latter; and finally, the wrinkled appearance, soft texture and greyish-brown colour of the first, which differ from the fuller aspect, denser woody structure, and reddish-brown colour of the fibres of the second. Geiger says that the genuine root presents the medutillium of a soft, fleshy consistence. In the article just described, this portion is ligneous and decidedly fibrous. Pereira mentions, as a distinctive mark of the *A. spicata*, that, when cut transversely, the fibres present the form of a cross; this is most evident in the specimen before us, but it is not so much to be relied on as we at first supposed. The smaller central point of the true hellebore is more or less stellated, showing that the medutillium, when in the fresh state, was angulated. On examining the green hellebore (*H. viridis*) we have found the same structural formation, and have further traced it in *Cimicifuga racemosa* (formerly *Actæa*.) It may belong to this order. Upon soaking the fibres in water, the rounded figure and smaller size of the centre of the black become apparent.

Upon first examining the specimen of false hellebore, we were struck with its resemblance to the black snake root of our country, and from Guibourt we learn that Bergius, in his *Materia Medica*, has given to this root similar characters to those of the false hellebore of Europe. From these comparisons, and the statements of Murray and Bergius, as well as the description of Guibourt of false hellebore, we are induced to suppose that his specimens and our own are the same, and that he has gone too far in supposing, from mere odour and taste, that the plant was unknown.

CHEMICAL COMPOSITION.—Feneulle and Capron analyzed

this root, and found it to contain *volatile oil*, *fatty oil*, *volatile acid*, *resinous matter*, wax, bitter principle, ulmin, gallate of potash, ammoniacal salts. Vauquelin had previously obtained a *very acrid oil*, extractive, starch, vegeto-animal matter, sugar, lignin. Bouchardat thinks that the active part may be the volatile acid, which is closely connected with the fatty matter. The acrid oil of Vauquelin is evidently a compound of the three first principles of Feneulle and Capron. All of which may be active, as well as the resinous and bitter substance.

The *acrid oil*, (soft resin, Gmelin,) *Helleborin*, is odourless, has an acrid taste, and is soluble in spirit. According to M. Orfila, age has a decided influence in causing deterioration, from which would be inferred the volatile character of the active principle.

Black hellebore is a medicine of great antiquity ; the earliest notice of it in any work on *Materia Medica*, we have in that of Theophrastus. The first precise specific account of it is in the work of Dioscorides, and it was for a long time supposed that the *ελληβορος μελας* of that author was the *Helleborus niger*, of Europe. Matthioli, his commentator, was of opinion that the same plant, or one of the European species, constituted the far-famed Grecian one, for he mentions three species, one of which appears not to belong to *Helleborus*.* The terms of description employed by Dioscorides as not applying to the *H. niger*, seem to have struck Scaliger,† but it was not until in 1700, when Tournefort made his celebrated voyage into the Levant, that the discrepancy was explained. This traveller there found a species of *Helleborus* which corresponded to the description of Dioscorides, growing in the greatest profusion in Anticyra, also in Boetia, Eubœa and upon Mt. Helicon.

*In fact, there seems to have been a confusion between the species of *Helleborus* and *Veratrum*. The Latins confounded both genera under the head of *Helleborus*.

† Commentary on Theophrastus. Amsterdam, 1644.

The description of Dioscorides is as follows: "The leaves are green, and like those of the Plane, sometimes they are less, and approach a little the leaves of the spondylium, (*Heracleum sphondylium*,) becoming a little black, and incised in many places; the stem is coarse, and the flowers red, bordering on white, connected together in a cluster." Tournefort gave to it the name *Helleborus niger orientalis*. It was first figured by Desfontaines, in his "Choix des Plantes du corollaire de Tournefort." Dr. Sibthorp says he met with the same plant at Athos, Delphi, Olympus, Bithynia, in the mountains round Thessalonica, and also near Constantinople; it was the most commonly diffused species. He gave it the name *H. officinalis*, and regards it as the *ελεβορος μελας* of Dioscorides, which is evident from the description, "*H. officinalis*, leaves pedate, scape multi-flowered, bracts digitate." (*Flor. Græc.*) The present Greek name for it is *Εκαρφη*. By the Turks it is called Zopheme. The *H. niger*, of Italy, was also found by him in Laconia and Mt. Athos. Lemary in his "Dictionnaire Universel des Drogues Simples," calls this species "*Helleborus niger Hippocratis*," to distinguish it from the other, and draws a clear distinction. A beautiful figure of the *H. orientalis* is given in the Botanical Register, vol. 28, t. 34, from a plant grown from roots sent to England, gathered on the Bithynian Olympus, by Mr. Sanderson, H. M. Consul at Brusa.

From the preceding exposition, it is evident that the term black hellebore is not strictly confined to the species now recognized in the Pharmacopœia, and what is said with respect to the mode of affecting the system, and its therapeutic employment, is applicable to two or more species. This applies especially to the ancient writers.

The *H. niger* was introduced and cultivated in England in 1598, by Mr. John Gerhard.

Connected with black hellebore, not only in the older works on the Materia Medica, but classically, is the name *Melampodium*, which, as stated by Dioscorides and other

writers was given in honour of a shepherd by the name of Melampus, who administered the drug to the daughters of Proetus.

MEDICAL EFFECTS.—Black hellebore is a powerful irritant; if applied externally in the fresh state, it produces rubefaction and vesication; taken internally, it nauseates, vomits, and produces more or less purgative action upon the bowels. Even when given in moderate doses, it is harsh and drastic in its effects, and is generally regarded as unsafe in this way. Orfila found in animals that it produced inflammation of the stomach, and insensibility and paralysis of the nervous system, followed by death. (*Tox. Gen.*) Its use at the present time is as an emmenagogue; as such it was recommended by Dr. Mead. It produces a stimulating impression upon the pelvic organs. Details with respect to the different modes of operating, according to the dose or the disease in which it has been employed, would be out of place in this essay. We may, however, present the summary of Bergius, with respect to the difference in modes of action, depending upon the freshness or otherwise of the drug. “Virtue of the recent, poisonous, rubefacient, vesicant; of the recently dried, emetic, purgative, emmenagogue, antiphthiriæc, sternutatory; of that long kept, scarcely purgative, alterative and drastic.” The reputation possessed among the ancients by hellebore, was principally in connection with its use in mania; and as it grew abundantly in Anticyra, that island was classically famous for its cures, hence the figurative reference which is frequently met with. Horace, in referring avarice to a species of insanity, thus satyrically alludes to hellebore and its place of growth:

Danda est ellebori multo pars maxima avaris
Nescio an Anticyram ratio illis destinet omnem.

PREPARATIONS.—Two preparations are officinal, the *Tincture and Extract* of the U. S. Pharmacopœia. With regard to them, Mr. Procter has furnished the following note:

“The first is a good preparation, and is the one more generally used. The extract *may* be a good and active medicine, if properly prepared. The old mode by boiling in water was calculated to dissipate the volatile principle, and not to dissolve the resin. The present formula in which the menstruum is diluted alcohol, by displacement, affords a valuable extract.

“When a tincture of black hellebore is distilled to recover the alcohol, the distilled fluid smells of the hellebore, and becomes slightly milky by admixture with water, and evidently contains volatile oil. The aqueous extractive liquid in the still has a portion of fluid resinous matter floating on its surface, and also a portion at the bottom of the vessel. This, when separated, and the adhering liquid washed from it, is of a transparent, brown colour, extremely friable, and by standing loses its transparency by the numerous fissures that traverse it, like in the best gum arabic. Its taste is very bitter, without any of the aroma of the root. It is soluble in alcohol .835, but is only slightly soluble in washed ether, the residue being more bitter than the dissolved portion. It does not inflame very readily, but when thrown into the fire burns with a smoky, resinous flame.

“In making the extract, this resin, if at first removed, should be pulverized, and subsequently incorporated with the extract.

“Its therapeutic properties have not been examined.

“In treating hellebore root by displacement with diluted alcohol, it is best to slightly moisten the coarsely powdered root with the menstruum, and displace an hour after, reserving the first concentrated liquids, which contain most of the volatile oil and resin. The root yields about 20 per cent. of extract.

“A wine, vinegar, decoction and ointment of hellebore are employed in European Pharmacy.”

ART. XXXIX.—ON THE MANUFACTURE OF PRUSSIATE OF POTASH.

BY AMBROSE SMITH.

THE process employed in this country for the manufacture of prussiate of potash from animal material, is not essentially different from the old German method as described in works on Chemistry.

Instead of the cast iron, egg-shaped pot or "bomb," as usually figured, what is called a "shell," is employed, having the shape of half an egg divided longitudinally; about 4 feet long, 30 inches greatest diameter at top, and 10 or 12 inches deep in the centre; the thickness of the iron about 2 inches at top, increasing gradually to about 4 inches at the bottom.

This shell is set solid in loam on a brick or stone foundation; at one end is the fire-hole of the furnace, the flame from which enters through a flue of about 5 inches by 8, directly into the shell, between it and a roof of fire tile, and passes through another flue about 4 inches by 5 in this roof, at the other end of the shell into the chimney stack. The roof which covers the shell, is composed of four or five tiles, 14 inches wide, and of various lengths to suit, which are laid across the shell resting on a course of fire brick built around its edge, and covered with several courses of brick and loam. Opposite the fire-hole, directly under the exit flue, is the door through which the material is introduced into the furnace, and the fused mass removed when finished.

In some factories the iron shell is dispensed with, a bed of fire brick set on edge, and built very closely, so as to be impervious to the fused potash being substituted for it, form-

ing a reverberatory furnace of similar construction in other respects.

Pine wood or rosin is the fuel usually employed, coal has been tried, but we believe unsuccessfully. A chimney having a good draught is required, and much of the success of the manufacture depends upon the proper construction of the furnace, and disposition of the flues, so as to maintain a steady and sufficient heat, as under a full red, prussiate is not formed; and, on the other hand, not to have the heat and draught too great, which would cause waste by sublimation of potash and too rapid combustion of animal material.

The furnace having been heated to full redness, the charge of potash is thrown into the shell, and when it is perfectly fused, four or five lbs. of iron filings are added and stirred in, the fuel in the fire hole removed or allowed to burn out, and through the working door, the animal material is introduced, a shovel full at a time, each portion being mixed well into the potash with a long iron poker, until the mass becomes homogeneous, and the flame nearly ceases. When the full charge of material has been mixed in, the working door is closed, and a few billets thrown into the fire-hole, the flame from which is suffered to play over the mixture until it is thoroughly fused. The red hot pasty mass is then briskly stirred with the poker for a few minutes, and finally ladled out with a long-handled iron ladle, into a pan or an old shell, where it concretes on cooling into a solid mass of a green colour externally, darker within, and having a somewhat crystalline fracture, which is technically called the "cake." It usually requires about half an hour to melt the potash, one and a half or two hours to mix in the animal material, and fifteen minutes to "cook the cake."

From sixty to eighty lbs. of good commercial potash are employed for a charge, and about twice its weight of animal material, consisting of horns, hoofs, dried blood, greaves from the tallow chandlers, woollen rags or leather.

Some manufacturers use thrice the weight of material to the potash, but this is too large a proportion, as the mass becomes so stiff that the animal matter cannot be mixed in rapidly enough to save it from burning to waste. The amount of material that can be used to advantage is indicated by the consistence of the pasty mass which should always be soft enough to flow readily after the poker. The thickening of the mass is owing to the deposition of carbon by decomposition of the animal material, and hence those kinds which contain least carbon can be employed in the largest proportion to the potash. Thus a greater weight of horn can be used than of leather, for the same weight of potash.

The material should be perfectly dry, as, if damp, it chills the furnace, and causes great loss of product.

Horn yields eleven to twelve per cent. of prussiate, dried blood, and hoofs ten to eleven per cent, greaves about ten per cent., leather five or six per cent., and rags from four to ten per cent., according as they are all woollen, or more or less mixed with cotton, the latter substance, of course, not producing any prussiate. Another practical point to be attended to, is the fact that heavy material is more productive than light of the same kind; as, for instance, horn pieces are much to be preferred to the shavings, on account of mixing more readily into the fused potash, the light material burning to waste on the surface of the alkali before it can be mixed in.

The furnace is worked night and day by relays of workmen, and when in good working order turns out fifty-four to sixty cakes weekly. Each cake yields from ten to eighteen lbs. of refined prussiate, according to the quality and quantity of the material employed, the skill and faithfulness of the workmen, and the greater or less perfection of manipulation.

A prussiate furnace, if working properly, seldom lasts more than two months; the iron shell having to be renewed,

being in that space of time almost wholly dissolved from the action of the fused potash and prussiate at the high heat required. A shell of the dimensions before described, weighing over two thousand pounds, wears away in from eight to ten weeks, so that when removed, the iron remaining will weigh frequently less than two hundred pounds.

In 1845 there were from twenty to twenty-five such furnaces in operation in the United States, which consumed at the rate of three to four thousand tons of animal material, and at least 700,000 lbs. of potashes annually, in the manufacture of prussiate, but the demand for the article having diminished, the manufacture is on a considerably reduced scale at present.

The cakes, after cooling, are broken into fragments, thrown by portions into a kettle of water set over a furnace and heated nearly to boiling, and diligently stirred with a long iron chisel to facilitate the solution and prevent the adhering of the cakes to the bottom of the kettle, which might cause its fracture. Enough cake is thrown in to bring the solution to the proper strength, (thirty to thirty-two degrees Baumé.) The black liquid thus formed, consists of potash, prussiate, soda, ammonia, and lime. It is strained, while hot, through canvass bags, which separate the insoluble impurities into iron kettles set in the ground, where it is allowed to stand several days. The bags and "black dirt" contained in them which consists chiefly of animal charcoal, are subsequently washed to remove the prussiate liquor absorbed by them, and the wash liquor used instead of water, for the solution of fresh cake. On the cooling of the filtered liquor, the prussiate of potash gradually forms on the bottom and sides of the kettles in small yellow crystals. After standing a sufficient time, the mother liquor is drawn off the crystals, the crude prussiate drained and "refined," by dissolving in hot water, straining and crystallizing, until sufficiently pure, which usually requires two re-crystallizations.

The mother liquor from the crude prussiate is concentrated by evaporation 10 degrees of Baumé's hydrometer and again allowed to stand two or three days. A copious deposit of white crystals now forms out of this liquor, which is called "the salt." From this "salt" by solution in hot water to 30° Baumé, and crystallizing, from 10 to 15 per cent. of its weight of prussiate is obtained. The residue consists of various salts, chloride of potassium, carbonate of soda, and sulphate of potassa, from the impure potash used, phosphates of soda &c., from the animal material, various salts of ammonia and lime, traces of cyanides, ferrocyanides, sulphocyanides, &c. The largest portion being chloride of potassium, which forms a large per centage of impurity in commercial potash, the amount of this impurity, (at all times existing,) being sometimes increased by the fraudulent addition of common salt to the wood-ash ley, which by double decomposition forms chloride of potassium and carbonate of soda.

The mother liquor from which the "salt" has crystallized consists chiefly of a solution of carbonate of potassa, which is recovered by evaporation to dryness, to be used again in the furnace. In this way about half the potash originally employed is recovered.

As horn contains about fifteen per cent. of nitrogen, and crystallized prussiate of potash only about twenty per cent., it is obvious that theory would indicate a much larger product of prussiate than is obtained in practice. The great loss of nitrogen probably occurs chiefly in mixing the stuff with the potash; that portion which is decomposed before it is thoroughly incorporated with the fused potash being lost, the nitrogen passing away in the form of ammonia.

There is also loss of nitrogen by generation of ammonia in the solution of the cake, this gas being sensibly evolved from almost all the kettles in the prussiate factories; from the liquor which is boiled down for the recovery of the potash after the separation of the prussiate and "salt," a large quantity of ammonia is uniformly disengaged. This forma-

tion of ammonia has been attributed to the decomposition of cyanide, which has not taken up its proper dose of iron, and it has heretofore been recommended to add a proto-salt of iron to the liquor formed by dissolving the cake. We have not found this addition of any service in preventing the formation of ammonia, and as iron in a finely divided state is always in excess in the cake, it is scarcely probable that there is any considerable quantity of uncombined cyanide in the liquor.

We are more disposed to attribute the ammonia to the presence of cyanide, resulting from the oxidation of the cyanide in the furnace, when the flame beats too directly on the mass. Cyanate of potassa is decomposed on boiling into ammonia and bicarbonate of potassa. A more accurate investigation of the cause of this formation of ammonia is desired by the manufacturer of prussiate, as every equivalent of ammonia disengaged, indicates the loss of an equivalent of cyanide.

A modification of the process has been proposed and patented in England, by which the animal material is decomposed in iron retorts, heated to redness; the gas disengaged being conveyed by curved iron pipes under the surface of a fused mixture of potash and carbon contained in another retort. This method is stated by the patentees to yield a larger product, and a greater proportion of animal material to the potash can be employed, as the carbon resulting from the decomposition of the animal material being retained in the first retort, does not mix with and thicken the cake. We have seen no account of the practical working of this method, but doubt whether the increased complexity and expense of apparatus will not counterbalance its advantages.

Other sources of nitrogen than the material usually employed, have also been resorted to, as for instance, the crude ammoniacal salts from the gas works, the gases resulting

from the calcination of bones, &c., and finally, the atmospheric air.

The theory of reaction, in all the processes, is identical, and results from the fact that when nitrogen alone, or in combination, is brought into contact with a mixture of potash and carbon, at a bright red heat, cyanogen is produced by the union of carbon and nitrogen, and which combines with potassium, reduced from the potash by the action of the carbon, forming cyanide of potassium. If iron be present in the mixture of fused cyanide, it is taken up on treating the mass with warm water, forming ferrocyanide; the iron being dissolved very readily, whether existing as metallic iron, oxide or sulphuret. Animal matter, when mixed with fused potash according to the old process for the manufacture of prussiate, yields both the carbon and nitrogen necessary for this reaction. It has long been known to chemists that a similar effect occurs when gaseous ammonia is passed through charcoal impregnated with potash and heated to redness. This was the method by which Scheele confirmed synthetically, his original analysis of hydrocyanic acid. Within a few years past it has been discovered that the same results ensue when atmospheric air is passed through a similar mixture, and as this latter is of course the cheapest of all the sources of nitrogen, it is desirable to ascertain a practical and available method of applying it for this important manufacture.

Mr. L. Thompson, of Lambeth, England, is said by Ure to have been the first to apply the principle of the formation of cyanides from atmospheric air, practically. His method is to expose at a red heat a mixture of two parts each of coke and carbonate of potassa, and one part iron turnings in a shallow pan for some time, frequently stirring. There is certainly some formation of cyanide by this method, which we have frequently repeated, but, according to our experience, the proportion is insignificant, and it will not answer for the manufacturer.

A patent for a process by which the nitrogen of the air is applied under much more favourable circumstances, was taken out in England, in 1843, by Mr. Newton, patent agent, on account of a foreigner, a detailed description of which, being an extract from the specification, has been republished in this journal. This process consists in causing a steady current of air, to be drawn by means of a suction pump downward through a column of alkalized wood or other carbon, in fragments contained in a fire clay cylinder, maintained at a white heat. For a particular description of the apparatus, we refer to the 19th vol. of this Journal. Soon after this method was first published, we tried it on the experimental scale with promising results. The apparatus employed by us, suggested by that described in the specification, consisted of a wrought iron cylinder, open at the top, and having a small screw orifice at the bottom, being a mercury bottle inverted, the bottom of which had been cut off. This was set upright in an open furnace, a curved gun barrel screwed into the smaller orifice passing between the bars of the grate out of the draught hole of the furnace. To the gun barrel a leaden tube was connected, which passed into a Wolfe's bottle containing water, for the purpose of washing and cooling the gases; this bottle was connected by another tube with a suction pump.

The iron cylinder having been heated to bright redness, one and a half pounds of wood charcoal in small pieces, which had been impregnated with half a pound of pearlash by solution, and subsequent drying, was thrown in. As soon as the mixture became heated, the pump was put in action, drawing a current of air through the ignited alkalized charcoal, the gases resulting being washed in the Wolfe's bottle before reaching the pump. The operation was continued about three hours. The gas drawn through during most of the time was nearly all carbonic oxide, which, on the application of a lighted taper, ignited and burnt continuously with a light blue flame, at the exit pipe

of the pump. The water in the Wolfe's bottle was found to contain considerable cyanide of potassium, carried into it by the current of air. The cyanized charcoal resulting having been lixiviated and the solution treated with protosulphate of iron, yielded about two and a quarter ounces of crystallized ferrocyanide of potassium. There did not appear to be more than about ten per cent. loss of potash, most of that employed, allowing for what was accounted for in the cyanide formed, was recovered on evaporation.

It is probable that the product would have been greater, had the operation been continued longer, and with a more intense heat.

Until recently we have had no account of the working of this beautiful and scientific process by the manufacturer, and, although it presents many advantages over the old method, yet the difficulties connected with the construction of cylinders of sufficient capacity, so as to stand the heat required, and with the working of the somewhat complicated apparatus on the large scale, are obviously great. It appears, however, by an account presented by M. Pelouze, to the Academy of Sciences at Paris, that the patentee referred to, after two years occupied in modifying and perfecting his apparatus, has actually succeeded in carrying it into large and successful operation at New-Castle-on-Tyne, in England. This account appears to be a partial report of a committee of the Academy,* and from it we take the following particulars of the new method of manufacture, as carried on at New Castle.

According to Pelouze, this process is a French discovery, having been first observed by M. Desfosses, of Besançon. Some years since, MM. Possoz and Boissière attempted to apply it on the manufacturing scale, and in 1843 they

* Notice on the fabrication of Cyanides by means of the nitrogen of the air: by MM. Possoz and A. Boissière. (Note presented by M. Pelouze, commissaires MM. Chevreul, Dumas, Pelouze.) *Compt. Rend. de l'Acad. des Sciences de Paris.* Feb. 1848.

had established at Grenelle, a trial apparatus, of sufficient capacity to enable them, in less than a year, to put into the market over 15,000 kilogrammes (33,000 lbs.) of prussiate of potash. But the dearness of fuel in Paris, and also the frequent repairs required by the apparatus they then employed, (fire clay cylinders in one piece, of $2\frac{1}{2}$ metres ($8\frac{1}{4}$ ft.) high, the fire being applied directly against the cylinder, the walls of which were 6 or 8 centimetres (2 or 3 in.) thick,) induced them to seek another locality, more eligibly situated, as regards the price of fuel and fire clay. Under these circumstances, an opportunity was presented them in 1844, of establishing their system of manufacture at New-Castle-on-Tyne, on account of an English company. One of them, M. Possoz, (having first, we presume, entered the English patent, before referred to,) devoted two years in effecting the various improvements in the construction of the apparatus which the new method required, and for the past two years, the factory at New-Castle-on-Tyne, which M. Dumas has lately visited, has been in successful operation, producing daily about 1,000 kilogr. (2,205 lbs.) of prussiate of potash, of remarkable purity and beauty.

M. Possoz has succeeded in rendering the apparatus capable of resisting, during many months, the destructive action of the potash, and the enormous heat the operation requires.

The apparatus is composed of a vertical cylinder, built of large fire bricks, which are made of the proper shape for the purpose; the interior diameter of the cylinder is one-half metre, (20 in.) the height which is heated to white redness is three metres, (nearly 10 ft.); through the wall of the cylinder, (one-fourth metre thick,) there are orifices at proper distances apart.

The cylinder being heated to white redness, and filled with wood charcoal in fragments, impregnated with thirty per cent. of carbonate of potassa, a suction pump determines a current of heated air, jets of flame, &c., from the air fur-

nace, or flue, heated to whiteness, which surrounds the cylinder.

The mixture of charcoal and potash is exposed during about ten hours, to the current of strongly heated gases, which penetrate the mass in all directions. The apparatus works continuously, the cylinder being fed from the top, in proportion to the quantity removed by an extractor at the bottom, which allows a determined proportion to escape regularly.

The cyanized charcoal after cooling in a cast iron receiver, into which it passes from the fire brick cylinder, falls into a reservoir containing water and native carbonate of iron. The liquors are evaporated and the prussiate crystallized in the usual manner.

The proportion of cyanide obtained by this process, from a certain quantity of potash, is greater with the nitrogen of the air, than with animal material according to the old method.

Soda acts in a similar way with potassa, but requires a still higher temperature.

Coke produces less cyanide than wood charcoal. The presence of the vapour of water, even in small quantity, diminishes the product of cyanide, or at least decomposes it as it is formed, giving ammonia.

Finally, pure nitrogen produces the cyanides more readily than when mixed with carbonic acid or oxide.

M. Pelouze observes that the consumption of animal material in France, in the fabrication of prussiate of potash, amounts to 3,000,000 kilogrs., (about 3,000 tons) annually, and remarks as one of the incidental advantages of the new method, that its adoption would save for agricultural uses this large quantity of animal matter.

ART. XL.—ON THE ETHERIAL SOLUTION OF PREPARED COTTON.

BY EDWARD PARRISH AND W. W. D. LIVERMORE.

THIS preparation originally prepared by Professor Schonbein, was recommended as an adhesive substance adapted to the purposes of the surgeon, in an article in the "Boston Medical and Surgical Journal," under date of "March 22d, 1848," by S. L. Bigelow. He there stated that he had accidentally discovered its remarkable adaptation to the rapid union of wounds by the first intention, and had tested its efficacy by a number of experiments. Its advantages were thus stated :

"1st. By its powerful contraction, upon evaporation, it places the edges of an incised wound in much more intimate contact than is obtained by sutures and adhesive cloth—unites them by equal pressure throughout the whole extent of the wound, and maintains them immovably fixed.

"2d. It preserves the wound perfectly from contact with the air—being impermeable to the atmosphere—while its adhesion to the skin is so intimate as to preclude the possibility of the air entering beneath its edges.

"3d. The substance remaining in contact with the skin and wound after the evaporation of the ether, seems to be entirely inert, so far as any irritating property is concerned, and this can hardly be said of any resinous adhesive cloth or preparation.

"4th. It does away with the necessity for sutures in incised wounds of almost any extent.

"5th. It is sure to remain in intimate contact with the skin until union is complete—and being quite impervious to water, and presenting a polished surface, it allows the surrounding parts to be washed without regard to the wound or dressing.

"6th. It is colorless and transparent, thus permitting the surgeon to witness all that goes on beneath, without involving the necessity for its removal.

"7th. No heat is necessary for its application, and the presence of any moderate degree of cold is only objectionable in retarding the evaporation of the ether.

"8th. It may be made at a trifling cost—an ounce phial, intrinsically worth little, being sufficient for a great number of dressings."

In the same article we find allusion made to its application in the formation of permanent splints, its use as a means of rendering pasteboard splints impervious to moisture, and the advantage to the pathologist of coating his hands with it before post mortem examinations.

The next number of the same Journal, issued one week later, contained an article on the same subject by John P. Maynard, of Dedham, Mass., in which he claims to have been the first to use the preparation as an adhesive plaster, and proceeds to detail its advantages as proved by a number of experiments made by himself and by numerous physicians and surgeons in Boston. In the same number of the Journal an editorial notice appears which recommends the *Colloidion*, as it is there named, in terms of approval, and in relation to its adhesiveness says, "nothing known to us will compare with it in this respect."

The discussion as to priority of discovery has been continued in several subsequent numbers of the same Journal. On the merits of this controversy we have nothing to say, nor do the numerous uses of this solution in surgical practice fall within the sphere of our investigations. What particularly concerns us as pharmacutists is its mode of preparation, and upon this subject both the writers referred to have left us in the dark. As soon as a demand was created for the article, Dr. Maynard's formula for preparing it was placed in the hands of Maynard & Noyes, Druggists, Boston, who commenced the manufacture of it on a large scale and measures were taken to introduce it in this city and elsewhere; as it became extensively known and esteemed among physicians and surgeons, of course a number of chemists attempt-

ed its preparation. This has been attended with varying success from ignorance of the precautions necessary to be observed, and from the absence of correct formulæ.

The following observations are the result of a series of experiments in making the solution which have several times disappointed us: as far as they go they are freely offered for the benefit of others who may be disposed to attempt it.

1st. Ordinary commercial gun cotton is not soluble in ether.

2d. The best formula that we have tried for the preparation of this solution is as follows:

Take of Nitric acid sp. gr. 1.452,

Sulphuric acid (Commercial) each, 1 fluid ounce,

Cleansed and bleached cotton, 2 drams.

Thoroughly saturate the cotton with the acids, and macerate for twelve hours. Then wash the cotton, dry it rapidly by artificial heat, in the shade, and dissolve it in

Sulphuric ether, one and a half pints.

3d. Gun cotton as thus prepared, will lose its solubility entirely, by being kept a few days, or particularly by being exposed to the sun's rays.

4th. The gun cotton prepared as above, is entirely soluble in the officinal sulphuric ether, though not in the hydrated ether or letheon.

5th. As many groundless objections to the solution are due to its being carelessly or improperly applied, care should be taken to saturate the fabric used in making the plaster, with the liquid, and to allow it to dry while in close contact with the skin, and where a permanent plaster is required, it is well to apply it over the exterior surface with a brush. When thus applied, a piece of muslin one inch in breadth, and applied over a space of an inch and a half in length, will sustain a weight of ten pounds, its adhesion not being affected by moisture or temperature.

6th. Some solutions of cotton, though resembling the

true *collodion* in appearance, are found to produce a plaster of inferior adhesive power, and which ceases to adhere on being moistened. Such specimens yield a white precipitate upon drying, which appears to be due to the presence of water. The residue, after the evaporation of the best specimens, is nearly transparent in thin sheets, having somewhat the appearance of tissue paper, and is not readily inflammable.

ART. XLI.—ON THE DECOMPOSING POWER OF WATER AT HIGH TEMPERATURES, IN A SCIENTIFIC AND INDUSTRIAL POINT OF VIEW, AS DEVELOPED BY R. A. TIGHLMAN.

BY WILLIAM PROCTER, JR.

THE important influence exercised on the arts for their improvement, by the discoveries in chemistry which are so constantly coming to light, is a cause of deep satisfaction to all who give a thought to the progress and amelioration of our race, through the increased facilities they afford to an enlightened civilization. Such, especially, are those discoveries which tend to cheapen and increase the production of substances closely connected with the comfort of mankind, and upon which all depend. He, then, is a true benefactor to his fellow men, who, whilst immured in the recesses of the laboratory, closely interrogating nature, elicits from her revelations fraught with mighty consequences to the economical relations of society.

Of this character appear to be the investigations and discoveries of Richard Albert Tighlman, in reference to the

decomposing power of water at high temperatures when brought in contact with certain chemical compounds, especially the oxy and haloid salts, of the alkalies and alkaline earths. It has long been known that a partial decomposition is effected in certain salts which have a strong tendency to retain their water of crystallization when they are dried rapidly with a strong heat—as the chlorides of magnesium and calcium; and this apparently spontaneous decomposition appears to be in proportion to the intensity of the temperature, to which the hydrous salt can be brought, before the water is volatilized. Mr. Tighlman, in reflecting on this phenomenon, conceived the idea that it was the nascent vapour which acted on the residual anhydrous salt which it enveloped, and that the same changes might be effected by bringing aqueous vapour, generated in a boiler, and heated by passing through hot tubes, into contact with the anhydrous salts in a suitably arranged furnace. In testing his idea practically, Mr. T. found his anticipations fully realized for “not only the anhydrous chloride of calcium, but the chlorides of strontium, and barium, could be rapidly decomposed by exposing them at a high red heat, to a current of steam; hydrochloric acid was copiously evolved and escaped with the excess of steam, whilst the bases of the respective salts were left in a free state.”

The facility of the decomposition, other circumstances being equal, appears to be in ratio to the volatility of the acid and fixedness of the base; hence chlorides are more easily decomposed than sulphates.

The oxy-salts do not, as in the haloid compounds, require oxygen and hydrogen to give basic and acid character to their elements before submitting to decomposition. Yet, nevertheless, it is well known that the sulphates of magnesia, lime, strontia and baryta sustain the strongest heats, *per se*, without decomposing; but when a current of hot steam is brought in contact with them in a heated state, decomposition ensues, their bases remain fixed in a free state, anhy-

drous, or as hydrates, whilst their acid is driven off partly as sulphurous acid and oxygen, and partly as sulphuric acid.

The degree of heat necessary varies with the salt. Sulphate of magnesia gives off its acid at a low red heat, and a large proportion of it escapes decomposition. The sulphate of lime, strontia and baryta require much higher temperatures, especially the last, which is best acted on at a low, white heat, and nearly the whole of the acid is resolved into the sulphurous acid and oxygen, in which state we will see that Mr. Tighlman proposes to apply it directly to the manufacture of oil of vitrol.

Successful in the preceding cases our author was not slow in extending the application of his experiments to other compounds; he found that even sub-phosphate of lime slowly gave up its acid, when subjected to the same conditions. Parallel with this, certain silicates, borates, fluorides and chromates were tried with equal success, thus proving the extensive applicability of the principle or law.

These happy results naturally lead to the inference that the sulphates and chlorides of the alkalies proper, would readily submit to the same decomposition, but on trial it proved that although at first the decomposition was effected to a small extent, yet it soon apparently ceased, and no increase of heat or steam would vary the small percentage of alkali in the residual salt. Referring this peculiarity to the vaporization of the alkaline hydrates as soon as liberated, substances, capable of forming fixed compounds with the alkalies were mixed with their salts before acting on them, when it was found that the acids were disengaged with facility. The first trials were with lime and magnesia, which have but a feeble affinity for the alkalies; but the most favourable results occurred when pure alumina was used. The acid character of alumina, in reference to the alkalies renders it peculiarly proper for the function in question, and it has accordingly been adopted as the agent in the patented process for obtaining soda from salt.

When potash alum is calcined, the aluminous sulphate parts with its acid, whilst the alkaline salt remains admixed with the alumina. Berthier has stated that the continued action of heat on this mixture, results in the displacement of the sulphuric acid by the albumen, which remains combined with the alkali. Tighlman, in carefully repeating this experiment, avoiding the contact of aqueous vapour, observed no decomposition even at a white heat; but when water was present, even in small quantity, the decomposition was rapid; hence he infers the accidental action of watery vapour in Berthier's experiment.

From the action of aqueous vapour on anhydrous alum, Tighlman was lead to infer a similar action would take place when its mineral representative, felspar, which is a double silicate of alumina and potash, was placed in the same circumstances. On passing steam through a quantity of that mineral in small fragments, highly heated, no apparent effect had taken place, but partial fusion, and a certain degree of vesicularity in the portions most exposed. When, however, these were pulverized and boiled in water, the concentrated solution was strongly alkaline from the aluminate of potash it held in solution.

Tighlman infers from the experiments he has heretofore made, the following general rule, viz.: "Whenever a salt from its own elements alone, or by the addition of those of water, can produce a volatile acid and a fixed base, the evolution of this acid, and the liberation of this base will be determined by passing a current of aqueous vapour over the salt raised to a high temperature. When either the acid or base to be liberated, forms a combination with water which can resist decomposition by the heat employed, the tendency to form such hydrates adds much to the decomposing power of the aqueous vapour. Although potash and soda are not by themselves fixed bases at high temperatures, yet by the use of the substances before mentioned, they can

form combinations which are fixed, and by this means their salts come under the above rule."

The facts developed by Tighlman tend to explain many geological phenomena of volcanic character, especially the evolution of boracic and silicic acids in Tuscany and Iceland, and will doubtless lead to many other important results of a purely scientific connection.

Having before me an official copy of the Letters Patent granted by the British government to Richard Albert Tighlman, on the 1st of February, 1847, giving him the full right and power to manufacture under the same, as well as some letters from the patentee, exhibiting the efforts that have been made towards perfecting the practical working of his processes. I will give such parts of them as will prove of interest.

The first patent embraces the right to make certain salts of potash, as the sulphate, chloride and chromate, from felspars containing that alkali, and the proportions mentioned in the patent are intended for a felspar containing sixteen per cent. of potash. To obtain sulphate of potash, two parts by weight of felspar, one part of lime, or an equivalent quantity of carbonate of lime, and one part of sulphate of lime, (or sulphate of strontia or baryta, though the lime salt is preferred,) all reduced to fine powder, are intimately mixed, placed on the hearth of a reverberatory furnace, and kept at a bright red heat for eight hours, the mixture being stirred from time to time, that all parts may be equally heated. The sulphate of potash forms most rapidly at a high temperature, but the heat must not be sufficient to cause fusion, else the subsequent process of extraction, will be materially interfered with. It is also necessary that the atmosphere of the furnace should not be deoxidizing so as to injure the product, to regulate which, the furnace is constructed with openings above the fuel, to admit sufficient air, so as to keep the atmosphere at a proper oxidizing condition. The heating is continued for about eight hours, the

charge withdrawn, and lixivated repeatedly with hot water, (as some of the salt adheres obstinately to the sulphate of lime.) The solution of sulphate of potash is now evaporated, observing to remove the sulphate of lime which precipitates during the evaporation, from time to time.

When a cheap, abundant supply of sulphurous acid is at command, as in the case of roasting sulphurous ores, the use of sulphate of lime or other sulphate may be dispensed with, by doubling the quantity of carbonate of lime and exposing the charge while at a red heat, to a current of sulphurous acid gas and air, (frequently stirring) by which means sulphate of lime is formed during the process, and the sulphate of potash is produced as before.

Muriate of potash (chloride of potassium) is obtained by heating potash felspar with muriate of soda, lime, or iron, at a temperature above the fusing point of the muriate employed. The patentee prefers the muriate of soda, which is mixed with an equal weight of finely ground felspar. The mixture is well dried and introduced into a horizontal iron cylinder, protected by fire brick from the action of the fire, having an opening at one end, which is closed by an iron door and luted tight. A small hole is made in the upper part of the door, which is fitted with a loose plug to prevent the bursting of the cylinder from the escape of any accidental evolution of gas. The cylinder is kept at a bright red heat for six hours, the cover is then removed, and the charge raked out as quickly as possible into an iron pot, which is immediately covered and kept closed till the mass is cool, when it is lixivated, and the muriate of potash isolated from the other salt by evaporation and crystallization.

Chromate of potash is obtained by the following process: Four parts by weight of felspar, four parts of lime, or an equivalent quantity of carbonate of lime, and one part of chrome ore, all in fine powder, are mixed together, placed on the hearth of a reverberatory furnace, and kept at a bright red heat for eighteen or twenty hours, being properly

stirred in the interim, to effect its uniform oxidation. The atmosphere is kept in an oxidizing state by the admission of sufficient air directly into the chamber, and the heat is so regulated as not to cause even incipient fusion, the charge being kept in a porous state. When the usual examination shows the proper quantum of alkaline chromate, the charge is withdrawn and lixiviated with water.

Improvements in the manufacture of certain acids, alkalies and alkaline salts.—The patentee claims the right to make certain acids, alkalies and alkaline salts, by exposing at a high temperature certain salts containing such acids and alkalies to the action of aqueous vapour, by which the acid is carried off, and the alkaline base either remains free or enters into combination with some third substance provided for that purpose. To obtain sulphurous and sulphuric acids, sulphate of lime is preferred, and the operation is thus performed. A fine clay cylinder of close texture, and any convenient size, is placed vertically in a furnace, and provided with openings at top and bottom, for charging and discharging, which openings are capable of being closed air tight. To the top of this cylinder a fire clay escape tube is adapted for conveying off the acid vapours, and to the bottom, for the admission of steam, another clay pipe is adapted, connected with a steam boiler by a series of fire clay tubes. In order to diminish the corrosion of the cylinder by the sulphate of lime or the lime itself, it is lined with a coating of native carbonate of magnesia, applied in a similar manner to the usual clay linings of chemical furnaces. The cylinder is filled with pieces of sulphate of lime one-fourth of an inch in diameter, and having luted the openings, the cylinder and its contents are raised to a high red heat, and steam is passed from the boiler through the red hot clay tubes into the bottom of the cylinder, and up through the charge. The heated steam, in its passage through the sulphate of lime, carries off the acid in the state of sulphurous acid and oxygen, with sometimes a little sul-

phuric acid admixed. The acid vapours pass off by the escape tube at the top of the cylinder, and are conveyed by stone-ware tubes into a leaden chamber, in order to combine them into sulphuric acid, by the usual means. The heat should not be so high at first, to melt the sulphate of lime in the cylinders, but is increased towards the end of the operation, as the charge becomes more infusible when partly decomposed. The condition of the escaping vapours is examined by an opening in the tube above, placed for that purpose, from time to time, and by the relative acidity of these, as ascertained by the usual test, the progress of the operation is judged of. The current of steam is regulated by a stop-cock, and is kept at that volume, which is found to generate the most acid vapours. When the evolution of acid vapours nearly ceases, the steam is shut off, the charge withdrawn from below, and its place re-occupied by a fresh one, to be treated as before. The withdrawn charge consists chiefly of caustic lime.

When the object is to obtain the acid and base of the sulphate of magnesia: the salt deprived of its water is placed in the cylinder in small pieces as before described for sulphate of lime, observing to keep the heat at low redness at first, to prevent the fusion of the charge, which would choke up the cylinder and prevent the passage of the steam. A low red heat is sufficient for the decomposition of the magnesian sulphate, and owing to this, a considerable portion of the acid escapes decomposition. The residue is chiefly caustic magnesia.

When sulphates of strontia or baryta are to be treated, the patentee prefers to use a reverberatory furnace, owing to the high heat necessary, which, though less advantageous in reference to collecting the acid vapours, is more eligible in relation to the fixed bases, which he esteems as the more important products of their decomposition.

A common reverberatory furnace heated by a coke fire is used, with the hearth covered with a compact bed of

native carbonate of magnesia three or four inches thick. The steam is introduced by several clay pipes passing through the roof of the furnace, so as to throw a current of heated steam over the whole width of the hearth. The sulphate, broken in pieces about half an inch in diameter, is spread over the hearth of the furnace, and brought to a high red or low white heat, when the steam is admitted. The charge requires to be stirred occasionally, the oxidizing state of the atmosphere kept up, and the intensity of the heat attended to; requiring to be higher for these two bases than for the sulphate of lime. When, on testing the charge, it is nearly or entirely soluble in dilute nitric acid, it may be withdrawn, and consists chiefly of the hydrate of strontia or of baryta.

The patentee obtains muriatic acid and strontia or baryta by treating the muriates of those bases by the same process as has been described for their sulphates.

The sulphates of potash and soda, though decomposable by the same means as directed for the sulphate of baryta, owing to the volatility of their bases, are not eligibly thus treated. The patentee employs a substance to aid their decomposition by fixing the bases in combination, and yet capable of giving up the alkali to water or carbonic acid water with readiness, which agent he calls a *combining substance*. Of the many substances thus endowed, he prefers alumina, or its sub-phosphate. Equal quantities of the sulphate of soda or potash and pure alumina are mixed in fine powder, spread on the hearth of a reverberatory furnace, and treated precisely like the sulphate of baryta, and when no notable quantity of sulphate remains undecomposed, the charge is withdrawn, lixiviated with hot water, and when the clear solution of aluminate of potash or soda has become cold, carbonic acid is passed through it till all the alumina is precipitated, when the solution of carbonate of potash or soda is drawn off and evaporated. The alumina thus precipitated is again used as the combining substance.

In obtaining the alkalies from the chlorides of sodium and potassium, the patentee directs that the vapour of these salts, generated in an iron retort kept at a cherry red heat, with a current of steam playing on its surface, be passed through a vertical cylinder lined with magnesia and filled with small fragments of pure alumina, the whole being heated to a high red heat, with a current of steam entering below, and passing up slowly along with the salt vapour. The salt is decomposed in its passage through the alumina, its base uniting with that substance, whilst its acid is carried off with the excess of steam, etc. The complexity of this process has led to its complete modification, by the adoption of a plan of great simplicity, to be described presently.

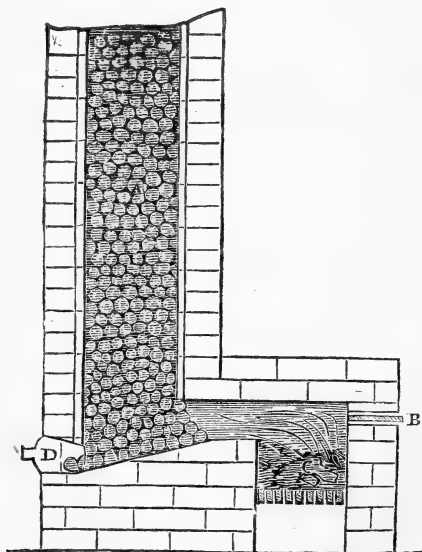
The patentee also obtains chromate of potash and soda by acting on a mixture of chrome ore with the sulphate or muriate of those bases, at a high temperature, with a current of steam and atmospheric air. The alkali, after becoming free, reacts with the chromic acid formed by the contemporaneous oxidation of the oxide of chrome, forming chromate of potash, which is subsequently removed by lixiviation, &c.

Soon after arriving in Europe, Mr. Tighlman applied to Professor Solly, of London, for his professional opinion in reference to his discoveries, and their application to the arts, and received in answer that they were perfectly new to him, unknown in Europe, and were fairly the subjects of patents. Also that the objects are of great importance, and are likely to lead to many profitable improvements in our existing manufactures, as well as probably to create a number of new ones. He acknowledges that the results communicated by Mr. Tighlman depended on a new and hitherto unnoticed law in chemistry, the probable future influence of which can hardly at present be estimated.

Subsequently, Prof. Solly gave a more formal opinion, founded on experimental researches, in reference to the processes, &c., and fully endorsed his first opinion.

In February last, this gentleman delivered a lecture before the Pharmaceutical Society of Great Britain, on "The decomposition of salts by hot steam," an abstract of which was published in the Journal of that Society for March last, in which, after dwelling on the various modes of overcoming chemical affinity in the processes of decomposition, he has explained the discoveries and part of the applications of Mr. Tighlman, and it is from that paper that the accompanying figure, illustrating the "soda process," together with some of the statements herein made, have been taken.

The main exertions of the patentee at the present time, are directed to the perfection of the soda process, as being the most directly important, although the potash one, should he succeed in bringing it to an equally practicable state, must eventually become of prime importance.



The chief difference between the first and the present process for making soda, consists in avoiding the use of retorts altogether. Equal quantities of chloride of sodium (salt)

and pure alumina, are intimately mixed, made into balls with water, and dried. These are placed in a tall, kiln-like furnace, protected as heretofore described, with an opening at the top for the introduction of the balls, and another at its base for their extraction, when the decomposition is completed. A represents the body of the kiln; C the fire-chamber, fed with coke or coal; D the door by which the charge is withdrawn from time to time as it is finished; fresh additions being made at the top so as to render the process continuous. The hot steam is admitted at B, where it mixes with the flame and heated air, and enters the interstices of the mass of balls conjointly with them, causing a uniformly moist atmosphere. The various precautions before described, as to temperature, the proportion of steam, etc., must be observed in order to effect the decomposition of the greatest proportion of the salt. Under favourable circumstances, seventy-five to eighty per cent. of the salt has been decomposed, though fifty per cent. can be effected with the greatest readiness.

The balls, on removal, consist of aluminate of soda with excess of alumina. When lixiviated, the solution consists of caustic soda, holding in solution a large quantity of alumina, which is readily separated in a form suitable for the purposes of the dyer.

Carbonate of soda (sal soda) is obtained at once by passing carbonic acid through the alkaline solution, till the alumina is precipitated, decanting the clear liquid, evaporating, and crystallizing:—or it may be obtained by exposing the crushed balls to the action of the carbonic acid of the air for a month, when simple lixiviation and evaporation yields the alkaline carbonate. Professor Solly, states that for some purposes of the arts, the crude alkaline solution may be employed at once, as in the manufacture of soaps.

The experiments on a moderate scale, which have been made in London and Glasgow, under the superintendence

of the patentee, have been more successful than his smaller trials, which leads to the inference of yet happier results arising out of improvements in the steam heating apparatus. They have also shown that the consumption of fuel, and cost of labour per ton of soda, will be less than one half of the old method. At the high price of the pure alumina used for their experiments, they can make soda much cheaper than by the old process, and as they have been able to extract that earth at one-sixth of the present manufacturer's price, the profits must be very considerable, viewed in reference to the immense extent of the manufacture.

Under date of May 18th, 1848, from Glasgow, we are informed that Mr. Tennant, of the St. Rollex' works, has completed a furnace on Mr. Tighlman's plan, and it was expected to be in operation within a short time.

When we consider, that according to Muspratt, of Liverpool, there are seventy thousand tons of soda ash made in Great Britain annually, valued at forty-five dollars per ton—three million one hundred and fifty thousand dollars—and that probably the rest of Europe makes as much more, we cannot but be struck with the immense importance of the new process.

But this is only one of a number of applications of the law of decomposition by steam. Vast deposits of sulphates exist, as gypsum and baryta, which by this process are available as sources of sulphuric acid on the one hand, and lime or baryta on the other.

This last earth will doubtless, if rendered a cheap material, be found to possess many valuable properties in the arts as a cement, &c., hitherto but little developed.

Magnesia, so largely consumed as a medicine, is at once obtained from the sulphate, without the long process of washing and drying the carbonate and subsequent calcination, and when attention is properly turned to this branch of manufacture, the pure sulphate may be at once converted into a superior medicinal magnesia.

Undoubtedly next to soda in importance, is the twin alkali, potash, which is now so extensively consumed in various arts and manufactures. In 1839, Canada exported potashes to the value of six hundred and eighty-eight thousand and sixty-seven dollars. (Hunt's Mag. vol. x., p. 10.) In 1843, nine hundred and twenty-five thousand four hundred and twenty-five dollars value were exported from New York alone, and in 1835 Russia exported six hundred and fifty-four thousand six hundred and forty-nine dollars, making an aggregate of two and a half millions of dollars, from those three sources, and all derived from the soil, through the elaborate processes of vegetable assimilation, combustion, lixiviation and evaporation, and depending on the destruction of forest growth, which annually removes its sources farther from the great commercial centres.

In view of all these facts, the prospect opened by the discovery of Tighlman, of obtaining an inexhaustible supply of potash from one of our most abundant rocks, is truly imposing, and will, when his processes are sufficiently developed, form one of the most prominent and lucrative branches of manufacture arising out of his patents.

In 1838, forty thousand tons of sulphur were consumed in the manufacture of sulphuric acid, in Great Britain, yielding one hundred and twenty thousand tons of acid, valued at five millions of dollars. Should the process of Tighlman, for obtaining sulphurous acid from the natural sulphates, be rendered available in practice, this branch will also be important. In conclusion, it may be observed that in an American point of view, with our vast deposits of coal and salt in the Atlantic region, and the abundant occurrence of the sulphates of soda and lime in our far western territory, a yet farther vista is opened, of the boundless natural wealth of our country yet in embryo.

ART. XLII.—A DISPENSATORY AND THERAPEUTICAL RE-MEMBRANCER; comprising the entire list of *Materia Medica*, preparations and compounds, with a full and distinct version of every practical formula, as authorized by the London, Edinburgh and Dublin Royal Colleges of Physicians, in the latest editions of their several Pharmacopœias, &c., &c. By John Mayne, M. D., &c. Revised with the addition of the formulæ of the United States Pharmacopœia, &c. By R. Eglesfeld Griffith, M. D., &c. Philadelphia: Lea & Blanchard. 1848. pp. 329.

As the cultivators of medical literature multiply, the increased facilities for study in the form of regular treatises are not more apparent, than are the number of works designed to assist the memory by presenting a condensed view of the subjects of medicine, intended for students on the one hand and practitioners on the other. Of the latter class is the book before us, which, as the title will suggest, is intended as a companion to the practising physician, to remind him of the composition of officinal formulæ, and to suggest forms for prescribing articles of the *materia medica* in view of their various applications, both external and internal.

The chief merit of the work arises from what may be termed its *condensed comprehensiveness*, presenting a large number of formulæ within a very small compass. The general classification is therapeutical, as *Cathartics*, *Emetics*, *Anti-spasmodics*, &c.; the preparations, simple and compound, of each drug are arranged under those heads which indicate their most prominent medical properties, as *Ipecacuanha*, under *Emetics*, *Diaphoretics*, &c. There is a condensed reference to the medical properties of each drug, with a statement of the plant or parts from whence, derived of which the following is an example, viz :

"DIGITALIS U.S. E. DIGITALIS FOLIA ET SEMINA, L. DIGITALIS PURPUREA, D. The leaves and seed (L) the leaves (U. S. E. D.) of Digitalis purpurea. Fox glove.

"*Use.*—(*Intl.*) in dropsies, more especially those induced by immoderate purging or bleeding. Dose gr. j. fractionally increased to two grains every 6 or 8 hours, until the kidneys are sufficiently influenced. Great attention must be paid to its operation, from its tendency to accumulate in the system and produce serious effects, often without warning symptoms. Diluents should accompany its use."

The forms will be especially useful to young practitioners, who are unaccustomed to associating remedies in many of their applications, and the absence of quantities leaves him entirely at liberty to exercise his judgment in that respect. An objection to the work, perhaps, will be found in its being composed chiefly of British formulæ, which, as being most prominent, those of the United States Pharmacopœia being interpolated, will necessarily render the reader more familiar with the foreign than our own pharmacopœia. This however is a disadvantage which this book shares with all the republished English works. As none but officinal formulæ are included, it lacks the advantage of a general formulary in not including the new preparations. Another feature which requires notice, and should be borne in mind by those who use the work, is the fact that the London and Edinburgh formulæ employ the Imperial gallon and pint measure while the Dublin and United States Pharm. direct the wine gallon and pint. At page 286, article Measures, it is stated that the imperial measure is used by the London and Edinburgh Colleges and that wine measure is employed by the United States Pharm. but no mention is made of the Dublin. Through the work itself, where different formulæ for the same tincture, etc. are given, the quantities of solids are varied, whilst the measure marks indicate no distinction. Thus, at Tincture of Digitalis it is stated, "macerate during 14 days leaves of fox glove, dried,

ziv. in proof spirit (diluted alcohol U. S. P.) Oij ; strain, L.” Now this indicates that these formulæ have the same digitalis strength, and merely vary in the strength of the alcohol, whilst in fact the London formula is one fifth weaker. This difficulty should be corrected, if the work reaches another edition, either on the plan of the United States Dispensatory, which is the best, or by placing a caution in the fore part of the book.

ART. XLIII.—ON ADULTERATED DRUGS.

GEORGE D. COGGESHALL, Vice President of the N. Y. College of Pharmacy, in a communication to one of the editors, relative to the action of Congress on adulterated drugs, says: “I embrace the occasion, also of transmitting a few samples, with short statements respecting them, and append a copy of proceedings at a meeting of the wholesale druggists of Boston, addressed to the President of this [N. Y.] College.

“The first package was marked ‘direct from Maracaibo, sold at seven cents per pound, one fifth off on the difference of currency. Invoice, fifteen hundred pounds.’ This article is of very inferior quality, though it presents the character of the Carthagenæ barks. No. 2, marked ‘Bark from Hamburg, eighteen thousand pounds, cost nine and a half cents. An invoice, from Amsterdam, cost from three to seven cents per pound. Both invoices passed within the last two weeks.’ The third package was labelled ‘Rhubarb, from London, three thousand three hundred and sixty pounds, cost three and a half pence sterling per pound, two and a half per cent. off.’ This specimen of Rhubarb has

little of the true odour, and is either very inferior rhubarb, or it has been extracted. These inferior articles, intended for medicines, all passed through our custom house within a few days. A large part of the rhubarb, so called, is known to have gone to Philadelphia, and the same is true of some inferior and mixed iodine, which passed here within a month, at about two thirds of the usual price."

These statements are all parallel with the evidence given in Dr. Edward's report which we now publish, and shows how completely all sense of responsibility, on the part of some importers and drug brokers is absent, if we may judge by their doings. In reference to the Bill which has passed the House of Representatives, it calls for the appointment of inspectors at each port of entry, who shall examine into the quality of drugs, and refuse the entry of such as are adulterated and vitiated. This bill, in passing the Senate, has been somewhat modified in some of its details. It provides for a qualified inspector at each of the six chief ports of entry — Boston, New York, Philadelphia, Baltimore, Charleston, S. C., and New Orleans. In other respects it is similar to the bill submitted, and after being again read in the House will become a law.

COPY.

BOSTON, JUNE 6th, 1848

J. Milhau, Esq.

Dear Sir,—At a meeting of a number of the wholesale druggists, held in this city, the following preamble and resolutions were adopted, and it was voted that they be forwarded to the President of the New York College of Pharmacy, with a request that they should be by him submitted to the chairman of the committee in Congress.

Respectfully yours,

(Signed,)

H. W. CUSHING, Sec.

Whereas, a spurious article has been imported into this market, recently from Smyrna, as opium, a part of which,

by chemical analysis, has been proved to contain no morphia, and was sold on the 8th inst. at two and five cents per pound, and another lot of inferior or spurious opium was sold at one dollar and thirty-five cents per pound; and, whereas, it is understood that other lots of a similar spurious article are on their way to this country, and whereas the external qualities so nearly resemble those of true opium, as to indicate that a regular business of preparing and putting it up is carried on in Turkey, which, if continued, will frustrate the skill of the physician and endanger the life of the patient; and, whereas, this subject has attracted the attention of the medical faculty and importers of drugs, and is now before Congress by a memorial from the N. Y. College of Pharmacy, and being desirous ourselves to defeat all such fraudulent designs, and to protect the community against them, therefore—

Resolved, That we will heartily co-operate with the merchants in this city, connected with the Smyrna trade, in their efforts to prevent the introduction and sale of spurious opium, and other adulterated drugs.

Resolved, That we will obtain and communicate such information as may be in our power, in order to prosecute impositions of this kind upon the community, and to aid the druggists in other cities in accomplishing the same object.

ART. XLIV.—EXTRACT FROM DR. EDWARD'S REPORT ON IMPORTED ADULTERATED DRUGS, MEDICINES, &c., READ BEFORE THE HOUSE OF REPRESENTATIVES, JUNE 2d, 1848.

COMPOSED, as is your committee, of a majority of men who have made the study and practice of medicine the chief purpose of their lives, they feel no hesitation in admitting that the facts they are about to submit were but partially known to them, individually, until a very recent period. They have had before them specimens of the adulterations of which they speak, and ask a generous confidence in their statements.

In consequence of the stringent laws now in force in most parts of Europe, regulating the trade in drugs, and the dispensing of medicines, none but genuine articles, and those of acknowledged strength and purity, are allowed to be used or purchased. All inferior and deteriorated drugs in a crude state, as well as adulterated medicinal and chemical preparations, must, therefore, as a matter of necessity, find a market elsewhere; and that market, unfortunately for the people of this country, has long been and still is found in these United States.

For a long series of years this base traffic has been constantly increasing, until it has become frightfully enormous. It would be presumed, from the immense quantities, and the great variety of inferior drugs that pass our custom-house at New York, in the course of a single year, that this country had become the grand mart and receptacle of all the refuse merchandise of that description, not only from the European ware-houses, but from the whole eastern world.

On reference had, not long since, to the custom-house books in New York, it was found that 7,000 lbs. of rhubarb root had been passed within ninety days, not one pound of

which was fit, or even safe, for medicinal purposes. Much of it had become greatly deteriorated by age, was worm eaten and decayed, while other portions, notwithstanding they showed a somewhat fair appearance externally, (the colour, &c., having been brightened by artificial means for the purpose of deception,) gave internal, unmistakable evidence of the virtue of the root having been extracted by previous decoction, for the purpose of making what is sold as the "extract of rhubarb," and thereby rendering it of no further value for medicinal use. This article was invoiced at from $2\frac{1}{2}$ pence sterling, (5 cents) to 7 pence (14 cents) per lb. The price of good rhubarb at the place of production, has been, for several years past, about as follows: The *East India*, from 35 to 45 cents per lb., according to circumstances; the *Turkey* or *Russian*, from \$1 25 to \$2 50 per lb., exhibiting a very wide difference in price, as will be perceived, between the good and refuse article.

Another of our more important articles of medicine, particularly in the newly settled portions of our country, comes to us in large quantities entirely unfit for medicinal purposes; but like the worthless rhubarb root, is eagerly bought up at auction sales by unprincipled drug dealers, and sent to the drug mills, where it is ground and powdered, the colour, smell and natural taste imitated, and afterwards sold to country dealers and others as a *good article*. The result of this is, that it is finally dispensed to the sick, at the sacrifice, doubtless, of many valuable lives every year; we mean the *Peruvian bark*.

Several varieties of this bark are used in medicine, viz.: the "yellow," the "pale," the "red," &c., but neither variety can scarcely ever be obtained, at the place of production, of good quality and in good condition, at a less rate than from 30 to 40 cents per pound; and the quality generally used for the manufacture of *sulphate of quinine*, (or the salts of *Peruvian bark*,) has not for years been obtained from those parts of South America where it is produced at

a less price than from \$60 to \$80 per quintal of 100 pounds. The worthless article, particularly referred to above, comes principally from Europe, and seems to be made up of the different varieties already named, as well as to be in a greatly deteriorated condition from age, or from having had its medicinal virtues extracted, for the purpose of making the extract of Peruvian bark, a valuable medicine.

From appearances, it consists mainly of refuse material collected together in foreign warehouses for exportation. It is invoiced from 2 to 7 cents per pound. Thousands of pounds of this trash have passed through the New York custom-house, at the above price, during the past year, and may justly be considered very dear even at those rates.

Columbo and gentian roots, and many more of the important crude drugs, come to us in a similar worthless condition.

Opium.—An article of priceless worth in the treatment of disease, is now sent to this country in a greatly and dangerously adulterated state; and as a proof that the fraud carried on in the preparation of this valuable drug is now made not only a regular, but an extensive business, we are assured, on most reliable authority, that it is shipped directly from Smyrna, the most important place of its production, deprived not unfrequently of *two-thirds of its active principle*, that proportion of its medicinal property having been extracted for the manufacture of *morphine*. Opium is found to be adulterated with Spanish liquorice paste, combined with a small quantity of some bitter extract, and when but moderately deteriorated in this way, the fraud is not easily detected at first view; but it has been passed from Smyrna, *by the way of some of the European markets*, so freely adulterated, that the fraud was readily detected merely by the smell! no analysis being necessary. The so-called *opium* of this description is often found infested with living worms. Of course this decaying mass is not sold to the retailer or jobber in this condition, but is previously

worked over and combined with a better quality of *opium*. Your committee embrace with pleasure this opportunity to present the name and services of Dr. M. J. Bailey, examiner of drugs, &c., at the New York custom-house, as one to whom the country, and especially the medical profession, are deeply indebted, for the firm and faithful stand he has taken for exposing these frauds. Enjoying the advantage of a thorough medical education, together with a ready and able pen, he has been industrious and successful, through the various journals of medicine and pharmacy, in calling the attention of both physicians and importers to these nefarious impositions. His communications with us have been frequent and important. Without awaiting a regular summons, Mr. Bailey repaired, at our suggestion to meet us, and we will subjoin the result of his examination before the committee. The activity and frankness of this gentleman deserves the highest commendation: we give an extract of a letter received from him, dated April 29th, in which he says, "I am sure such action (referring to a memorial of the national medical convention) will have great weight with the members of Congress generally, and cause them to act with more promptness than they otherwise would, whilst at the same time, it will be exceedingly gratifying to me, as I have from the first, in aiding the College of Pharmacy and my profession in their appeal, *used* the knowledge acquired in my present position with a single desire to advance the general good. Motives of self or pecuniary interest (had I listened to the prayers of those interested) would have prompted me to withhold from the public the facts I have willingly disseminated, in order that permanent benefit might result therefrom. Many an argument have I held with those who professed to think it no moral wrong, while it was more profitable to themselves, to impose such worthless and dangerous trash upon the community as we complain of."

"For many years a considerable proportion of the fo-

reign chemical preparations, medicinal extracts, &c., have come to us more or less adulterated; but the base fraud is no longer confined to that class of medicines. Opium is now adulterated to a most fearful extent, and so adroitly, as almost to defy detection by the unsuspecting and confiding purchaser. I have lately passed three invoices of opium from London, which, on opening the cases, seemed to all external appearances to be as it should, but a closer examination proved it a base compound of that drug with various vegetable extracts—the mass not affording more than about one-third part of pure opium. When I questioned the consignee, (and to the credit of our regular importers, most of these adulterated and deteriorated drugs and medicines are consignments from speculators abroad,) they admitted their private advices gave them to understand that the article ‘was not quite pure;’ yet, as the law now is, I must pass all such dangerous and rascally imitations, if they are found *to be charged at their full value, and in commercial language, to be the article specified in the invoice.* In fact, I have no authority to examine into the purity, &c., of any article further than to enable me to judge as to the correctness of the value expressed in the invoice.” We subjoin also a quotation from the Boston Traveller of last week, entitled “frauds in opium.” “About twenty cases of opium were sold at auction yesterday by John Tyler. It was imported from Smyrna and Liverpool in various vessels, and to all appearances was of equally good quality. Notwithstanding this, however, its price varied from \$3 45, \$1 35, *six cents, to three cents per pound.* An exposition of the fraud was made at the sale. It is said to consist in the extraction of the morphine, or vital principle of the drug, before exportation. This fraudulent opium was invoiced at a lower price than that of the first quality, but still greatly above its real value.”

Genuine scammony, another important drug, is now but seldom imported. Not a single pound of pure Aleppo

scammony has passed the New York custom-house during the last twelve months. The so called scammony, now imported, contains only about one half the active principle of the genuine article; it being a combination of that drug and a worthless vegetable extract co-mingled with clay. Pure scammony is an expensive drug; hence the object of its adulteration.

Many of the medicinal gums and gum-resins imported are so deteriorated, or combined with earthy or other matters, that they are not only unsafe, but worthless for medicinal purposes.

The medicinal extracts, which are very important medical agents when pure, were formerly made with great care, and of one uniform strength, but they now come to us not only prepared of the refuse or inferior drugs, but also greatly adulterated, &c. These worthless extracts, in external appearance, are well calculated to deceive—the parcels being as neatly put up, labelled, &c., as those of the genuine. They are sold by the foreign manufacturer, on an average at about one-half the price of the pure article.

In this business, as well as in the manufacture of chemical preparations used in medicine, there has been for years past a regular system of fraud carried on by many of the foreign manufacturers. They have not only expressed their willingness to prepare and send out to order, any article in their line, adulterated to any extent desired, with a corresponding price, to suit, but they now, it seems, keep constantly on hand a supply of the adulterated, as well as of the pure preparations, and when remonstrated with by our honest importers, they excuse themselves by saying that “they must accommodate demands or lose sales, &c., as both qualities are ordered in large quantities from the United States—the genuine article, as they are given to understand, for the seaboard, and the adulterated for the western trade!”

The *blue pill mass*, a vastly important and useful

pharmaceutical preparation, comes to us greatly and dangerously adulterated. This article, when pure, contains $33\frac{1}{3}$ per cent. of mercury, combined with conserve of roses, &c. The adulterated article, of which large quantities are imported and sold, is, according to the very correct analysis of Professor Reid, of the New York College of Pharmacy, as follows :

Mercury	-	-	-	-	-	-	-	7.5
Earthy clay	-	-	-	-	-	-	-	27.0
Prussian blue, used in coloring	-	-	-	-	-	-	-	1.5
Sand, in combination with clay	-	-	-	-	-	-	-	2.0
Soluble saccharine matters	-	-	-	-	-	-	-	34.0
Insoluble organic matter	-	-	-	-	-	-	-	12.0
Water	-	-	-	-	-	-	-	16.0
								<hr/>
								100.0

Thus it will be seen this spurious article *contains less than one quarter of the active principle of the genuine*, to say nothing of the indigestible earthy matter, &c.

Sulphate of quinine, or the salts of the *Peruvian bark*, a medicine now considered indispensable, and of universal use, particularly where *intermittent fever* prevails, comes to us adulterated in various ways. The usual method is to combine it with *salicine*, (the salts of the *willow bark*), *chalk*, *plaster of Paris*, &c. The salicine possesses similar medicinal qualities, and resembles quinine very much in appearance, but it is afforded at less than one-fourth the price, and is very far inferior in strength. This spurious article is largely imported, neatly put up in *French style*, with the label of the celebrated *Pelletier*, of Paris, (the original and always one of the most honorable foreign manufacturers,) on each article. This trash is made at an extensive establishment in Belgium, the whole business of which, your committee are informed, is to manufacture and dispose of base imitations of all the important foreign chemical and medicinal preparations. An agent of this

establishment has been in this country for the last ten months. His business is to effect sales, and obtain orders. No wonder that those suffering the affliction of fever and ague in the western country take quinine by the tea-spoonfull at a dose, rather than a few grains, which is all sufficient when the article is pure.

Calomel is imported not only crudely prepared, but more or less adulterated with a white argillaceous earth or clay, and other articles ; while it is put up after the manner, and bears the name of some well known and deservedly popular manufacturing chemist. The whole is a base imitation and fraud.

Large quantities of an imperfectly manufactured *iodine* is imported in kegs, and put in the usual small bottles and parcels here. It is very impure, black, and damp, and totally unfit for medicinal purposes.

Much of the *iodide* or *hydriodate of potass*, a valuable medicine when pure, is greatly adulterated by the admixture of nitrate of potass, (saltpetre,) thereby changing its nature, and rendering it comparatively worthless.

Many chemical preparations are not unfrequently misnamed ; imposing, by that means, upon the purchaser some inferior article, bearing a similitude to the genuine, but different in medicinal qualities and value ; the label and the mode of package affording no security to the honest purchaser.

Thus might your committee continue through the whole catalogue, as most of the fine medicinal chemicals are prepared of unequal strength and purity, for the purpose of cheapening their cost, thereby rendering them less effective and more uncertain in the treatment of disease, and, in some cases, actually dangerous to the patient as well as obviously unjust and greatly embarrassing to the physician. We will here, however, proceed no further ; believing the facts already set forth, respecting very many of our most important medicines, and those in daily use, will, if fully understood, satisfy your honorable body of the imperative

necessity of the passage of a law calculated effectually to put a stop to this reckless and murderous trifling with human life for the sake of filthy lucre. Every feeling of humanity, as well as regard to justice, towards those who are entrusted with the lives of the people, demand this at your hands.

As elaborate as has been the statement of facts already presented, we are unwilling to dismiss a subject of such vast importance without presenting *additional information*. Dr. Baily of whom we have spoken before, has had submitted to him by the committee a series of questions which we subjoin. His means of acquiring information, his careful observation, together with his general intelligence and integrity, commend to our confidence his answers to these inquiries.

“Question 1st. How long have you held the position of examiner of drugs, medicines, chemical preparations, &c., in the appraiser’s department of customs at the port of New York?

Answer. Since the 3rd day of December, 1846.

What is the amount of drugs, medicines, &c., &c. annually imported into New York?

Answer. The merchandise of this description entered at the New York custom-house, during the year 1847, amounted to something near one and a half millions of dollars; I cannot name the precise amount, as no separate record of that branch of trade is at present kept in the custom-house.

What proportions do the importations of drugs, medicines, chemicals, &c., into New York, bear to those entered at the other ports in the United States?

Answer. According to the records in the Treasury Department, full three-fourths of the entire amount of that class of merchandise is passed through the New York custom-house.

Will you have the kindness to state, as near as your memory, or any memorandums you may have, serve you,

the quantities of some of the more important drugs, &c., imported into the United States, or into New York, during the past year?

Answer. The quantity of camphor, crude, and refined, (principally crude,) imported into the United States during the year 1847, amounted to 177,403 lbs. Opium imported during the same period, 85,228 lbs. The quantity of Peruvian bark imported into New York, the same year amounted to 495,300 lbs.

Rhubarb root	87,640 lbs.
Gum Arabic	245,270 lbs.
Gum Myrrh	7,300 lbs.
Iodide or hyd. potass	18,450 lbs.
Calomel	5,680 lbs.
Morphine	5,600 oz.
Magnesia (calc. and carb.)	147,300 lbs.
Jalap root	26,350 lbs.
Refined borax	248,360 lbs.
Acetic acid	19,700 lbs.
Sarsaparilla root	75,000 lbs.
Oil of anise	7,342 lbs.
Tartaric acid	57,470 lbs.
Cream of tartar	805,000 lbs.
Gum ammoniac	9,490 lbs.
Gum assafoetida	18,960 lbs.
Iodine	6,340 lbs.
Blue pill mass	4,475 lbs.
Sulphate quinine	11,700 oz.
Supercarbonate of soda	344,270 lbs.
Epsom salts	60,900 lbs.
Carb. of ammonia	180,000 lbs.
Senna	51,300 lbs.
Oil of cassia	9,830 lbs.
Extract of liquorice	462,000 lbs.
Balsam of tolu	5,800 lbs.
Balsam of copaiva	108,350 lbs.

What proportion do adulterated, misnamed, and vitiated articles bear to those that are pure and of the proper strength?

Answer. More than one-half of many of the most important chemical and medicinal preparations, together with large quantities of crude drugs, come to us so much adulterated, or otherwise deteriorated, as to render them not only worthless, as a medicine, but often dangerous.

Name, as far as you can, the articles most commonly adulterated, or otherwise deteriorated, the manner of adulteration, &c., and the consequent difference in price between the vitiated and genuine article, with such other suggestions as you may deem to pertain to this question?

Answer. Opium is at present more frequently adulterated with liquorice paste, combined with a bitter vegetable extract, likewise with an extract made from the poppy plant, with an admixture of the leaves. An article called opium is prepared and sold for exportation in the foreign markets, composed of liquorice paste, extract of poppy heads and leaves, and a small portion of gum tragacanth, and a bitter vegetable extract. Another article of opium comes to us, more or less, and in some instances, entirely deprived of its active principle, the same having been extracted for the manufacture of morphine.

So called opium has passed the New York custom-house, within the last twelve months, so highly charged with liquorice paste, that not only was the smell very perceptible, but on account of the excess of saccharine matter thereby furnished, the worthless mass was alive with worms! Some of these adulterations are invoiced as low as one-third the price of pure opium, and of course are not worth that.

Calomel is adulterated with chalk, sulphate of barytes, and white lead, and furnished by the foreign manufacturer at about two-thirds the price of the genuine.

The *mercury or quicksilver* of commerce is generally

impure; *lead*, *bismuth* and *zinc* are found mixed with it. It should never be used in the preparation of medicine without previous purification.

Red oxyde of mercury or *red precipitate* is frequently mixed with *red lead*.

Blue pill mass is greatly and extensively adulterated. This article, when pure, should contain thirty-three and a third per cent. of *mercury*, combined with *conserve of roses*, &c.; but a spurious article has been imported to a considerable extent within the past few years, which is found, on analysis, to contain less than one-fourth part of that quantity, basely mixed up with earthy substances, &c. This worthless article is purchased from the foreign manufacturer at about one-half the price of the genuine.

Sulphate of quinine, another very important medicine, is fraudulently adulterated with *salicine*, *chalk*, *sulphate of barytes*, &c., rendering it comparatively worthless, if not dangerous as a medicine. This spurious article has been imported and sold in New York (neatly put up with the name, label, &c. of a popular manufacturer) by the agent of a foreign establishment, at the rate of *ninety cents an ounce*, when the genuine foreign article could not be purchased of the manufacturer for less than *two dollars and twenty-five cents an ounce*.

Large quantities of iodine are sent to us in bulk, and in a very impure condition, by foreign manufacturers and speculators. It is almost worthless as a medicine; but, nevertheless, it is bought up by *our* speculators, who have it neatly put up in small bottles, &c., and sell it as a good article. The same with *iodide* or *hydriodate of potass*, which is frequently found adulterated with *nit. potass*, (*saltpetre*) *sal. acetocella*, &c. *Bromide of potassium* is labelled and sold as genuine hydriodate.

Many of the foreign medicinal extracts are prepared and sold in reference to *price*, rather than *strength* and *purity*.

The foreign manufacturers prepare any *quantity* called for. *Compound extract of colocynth* (as the label imports) comes to us in a manner well calculated to deceive, but, on examination, is found to contain not one particle of *colocynth*. This spurious article is invoiced at about one-third the price of the genuine article. *Extract of Peruvian bark, sarsaparilla, rhubarb, hyoscyamus, jalap, &c., &c.*, of a like inferior description, are constantly being imported to a greater or less extent.

Very little, if any, of pure Russian castor finds its way to this country. An imitation compound of *dried blood, gum ammoniac*, and a little real *castor*, put up in artificial bags, is the article generally met with.

But one invoice of *real musk* has been imported into New York during the past eighteen months, while very large quantities of the artificial have been imported direct from Canton, where the manufacture is carried on to a great extent. This impure article is invoiced at less than one-fifth the price of the genuine, and is not possessed of any medicinal quality.

Very little pure and prime *gum myrrh* is imported ; most of it is adulterated by the admixture of other and inferior gums.

Most of the *gum ammoniac* now imported is more or less adulterated with common resin and earthy substances. It sells for less than one-third the price of the *guttæ ammoniacæ*, or pure gum. The latter is now seldom met with.

Gum assafœtida is most extensively adulterated with inferior mucilaginous gums, chalk, clay, &c. An invoice of some *four* thousand pounds of this article passed the custom-house at New York not many months since, and not one pound of which was proper to be used for medicinal purposes without previous purification.

Peruvian bark comes greatly mixed, and no small portion of it of a very inferior and worthless quality. We know of even twenty-five distinct species of this bark, and,

as may be supposed, they differ greatly in strength and price. Considerable quantities are shipped to this country after having had the active portion extracted for the purpose of manufacturing *extracts of bark*. The best article is imported or purchased for the manufacture of *quinine*; the other for powdering. It comes invoiced from five cents to one dollar per pound, according to the place of purchase and the quality of the bark. *Peruvian bark*, fit to be used in medicine, can only be bought at the place where produced, at from thirty-five to seventy and eighty cents per pound.

No pure *Aleppo scammony* has for a long time been imported through the New York custom-house, because the article inferior in strength and purity has taken its place in the market. The *Smyrna scammony* is always adulterated with some worthless vegetable extract, flour, ashes and clay. An article called *Smyrna scammony* (and a fair imitation) is occasionally imported, which has proved to be a combination of *jalap*, *gamboge*, *chalk*, *gum Senegal* and *ivory black*, without a particle of real *scammony* in its composition.

Thousands of pounds of worthless rhubarb root are sent out annually to this country for a market, by foreign speculators, principally from England. London being the greatest drug market in the world, it is but reasonable to suppose that large quantities of crude drugs, of a greatly deteriorated and inferior quality, must necessarily be constantly accumulating in their warehouses, which, on account of the long existing laws of that country, cannot find a home market, and, in consequence, must either be destroyed or exported to some place where there is no law to prevent their introduction. The article of rhubarb I have alluded to, is found, on examination, to be either greatly deteriorated by age, or as having been deprived of its medicinal virtues by decoction for the purpose (as with the Peruvian bark above named) of manufacturing extracts.

This worthless drug is generally found to be what was once East India rhubarb, and is invoiced at from four to fourteen cents per pound, when at the same time the most ordinary *fresh rhubarb* of the kind, fit to be used for medicine, cannot be purchased at the place of production for less than thirty-five to fifty dollars per hundred pounds. This trash is bought up by speculators for powdering, and is sold to the unsuspecting retailer as a "fair article."

More than one-half of the *cinnamon* imported into New York during the past year was a very inferior article; some of it nearly tasteless, on account of its virtue having been extracted by distillation, in the manufacture of the *essential oil*. Most of the oil of cinnamon comes more or less adulterated with inferior oils; and the same may be said of most of the other medicinal essential oils.

More than three-fourths of what is called *Croton oil* imported, is either adulterated, or an oil of inferior quality, made from an entirely different seed from that which furnishes a genuine article.

Much of the rectified medicinal naphtha imported is a crude preparation, and very impure. This, as well as many other medicinal preparations, such, for instance, as iodine, hydriodate of potass, magnesia, epsom salts, &c., are made in considerable quantities, without the requisite care, in the large foreign chemical establishments, where their regular business is to manufacture only the coarser chemical preparations, used almost exclusively in the arts. Of course these articles, being hastily and imperfectly prepared out of the 'odds and ends,' and as rudely put up for market, can be afforded at a much less price than the pure article. It is now common for the foreign manufacturer to send out to this country these articles, on consignment, with his other preparations, used in the arts. It may not be amiss for me here to say, for the benefit of the medical profession and dealers generally throughout the country, as well as for the *army and navy surgeons*, who purchase chemical and medi-

cinal preparations for the public service, that too much reliance, in their selections, must not be placed upon what purports to be the *name or label* of some noted and foreign popular manufacturers, which they may find attached to the bottle or package. For it must be borne in mind that, while many of the adulterated, fine chemicals, &c., come to us neatly put up in small quantities, for the retail trade, bearing a fictitious label, much of the very crudely and imperfectly manufactured chemicals I have named, together with considerable quantities of *morphine*, is imported in *bulk*; or, in other words, in bottles or cases, containing several pounds each, and bearing only the name of the article; giving us no clue to the real manufacturers beyond what may be gathered from the name or names of the exporters upon the invoice; and they are not unfrequently foreign commission merchants. Notwithstanding this, these crude and impure articles, in bulk, find, I regret to say, ready purchasers among the unprincipled dealers, who have them put up in small quantities, (similar to the genuine,) in foreign bottles, imported expressly for the purpose; to which is, afterwards, attached a neatly executed imitation label of some well known foreign manufacturing chemist. The articles are then ready for market, and are purchased by the unsuspecting, (for circulation throughout the country,) I fear, too often, on account of the label, and general external appearance of the bottle, without proper attention to the contents. Hence the reason many chemical preparations fail to meet the reasonable expectations of the country practitioners, who have neither time, means nor opportunity of analysis.

Whence do we derive the largest proportion of these adulterated and deteriorated medicines?

Answer. The largest quantity comes from England; but other portions of Europe furnish more or less of these base compounds and worthless drugs.

Is this traffic on the increase, proportionate to the increase in the trade of drugs, medicines, &c.?

Answer. It is.

What proportion of the importers in New York are engaged in this traffic, to any extent, with a full knowledge of the articles imported?

Answer. I know of but two or three of our regular and otherwise respectable houses, who order these vitiated articles from abroad. The business is more generally in the hands of commission houses, where 'good, bad, and indifferent' can be found, 'in quantities to suit the purchasers.' A great proportion of these adulterated articles I have reason to believe are consignments.

From your knowledge of medicine and the information acquired in your present position, are not the deceptions, in many instances, so great as to deceive, not only the people generally, but the profession at large?

Answer. Such is, unfortunately, too true, and what is more to be regretted, these base imitations are rapidly multiplying; giving, at the same time, evidence on the part of the manufacturer of increased proficiency in the deceptive art, as applied to the preparation of vitiated medicines.

Are you acquainted with any agents of foreign manufacturing chemists who travel in this country, for the purpose of collecting orders and effecting sales of adulterated medicines, &c.?

Answer. I am acquainted with persons of that description, and they have been among us for the past twelve months.

What is the best and most effective mode to put an end to the importation of adulterated and deteriorated medicines?

Answer. In my opinion, the object can only be attained by the passage of a law by Congress, making it necessary that all *drugs*, medicines, &c., before passing the custom-house, shall be subjected to an examination, strictly in

reference to their strength and purity, by properly qualified *examiners*, specially appointed to that duty; admitting to entry only those found of good quality, and prohibiting the introduction of all others.

You say *examiners* instead of *inspectors*. To avoid a misunderstanding of the term inspectors, appraisers, and examiners, will you please explain the difference in the duties of each?

Answer. The term inspector properly applies to those custom-house officers whose duty it is to take charge of vessels on their arrival from foreign ports, and discharge the cargoes in accordance with the directions specified in the permits or orders sent to them from the collector's office. They have only to inspect the *marks* and *numbers* of each package before it is discharged from the vessel, to see that the same correspond with those called for on the permit or order. They have *nothing* to do with the *contents of the packages*. When the vessel is entirely discharged, the inspector makes his return accordingly to the collector, and is then ready to be placed on board of another.

The term examiner applies to clerks in the appraiser's department, whose duty it is to examine by *invoice the contents* of such packages of merchandize as are sent to the public store by the collector for that purpose. If, on examination, the merchandise is found to be fairly valued, a return to that effect is made upon the invoice, and the examiner's check is countersigned by the appraiser; after which the invoice goes to the collector's office, and the merchant can obtain his goods by procuring an order on the storekeeper after paying the duties.

The term *appraiser* applies to the head of the appraiser's department, whose duty it is to exercise a constant and general supervision over the office, and countersign all returns upon invoices made by the assistant appraisers and examiners.

Do not the present laws permit the importer to call for a

re-appraisement of his goods when he is dissatisfied with the return of the examiner; and if so, please explain in what way?

Answer. The law allows the importer that privilege. The present laws and instructions from the Treasury Department require all goods to be examined and appraised, according to their fair market value at the place of purchase and the time of exportation. If, on examining the quality of the goods and the price specified in the invoice, it is the opinion of the examiner that they are charged below the market value, he must mark them up; or, in other words, add such a per centage to the invoice as will bring them up to the price at which they should have been invoiced, and on which additional value the owner or consignee must pay a corresponding duty. If the examiner add ten *per cent.* or more to the invoice, the owner or consignee is thereby subjected to the additional payment of a penalty of twenty per cent. on the whole amount of goods so 'marked up,' unless upon a re-examination the examiner's return is declared to be erroneous. To effect this re-examination, the owner or consignee must deposite with the collector an amount sufficient to defray the expense. The collector selects two disinterested merchants, and on their report decides the matter in controversy.

Give an example of a return on drugs, &c., under the present law, and one of a return under a law looking to their strength, purity, &c., as well as to their commercial value.

Answer. At present, if on examination the value, &c., is found correct, I copy on the face of the invoice the marks and numbers of each package examined, and write against it (supposing the article opium) 'one case of opium,' to which I affix my check or initials. Under a law requiring an extended examination into the strength and purity of the article, I should, after a thorough examination of the opium, for instance, proceed as above in copying the mark

and number of the package ; and if I was satisfied with the quality, &c., I should write ‘one case of opium, examined and found correct;’ but if I found the article not as it should be, I should write, ‘one case of opium, examined and found *not of the requisite strength and purity.*

If Congress prohibit the importation of these foreign adulterated medicines, will the domestic manufacturer be induced thereby to direct his attention the more readily to the preparation of similar articles ?

Answer. By no means ; for the obvious reason that the regular trade is ever watchful, and would soon detect any fraud of the kind, and trace it immediately home to its guilty source, when well directed public opinion would, in most instances, promptly apply the remedy at the expense of the reputation and business pursuits of the offending party. Let Congress protect our people from foreign impositions in this matter, and the States of this Union will separately, if needs be, protect themselves from domestic evils of the kind, by enacting stringent laws, in reference to the purchase and sale of medicines for home consumption, similar to those which have been most effectively in operation throughout Europe.

Do your commission merchants solicit consignments of these adulterated drugs and medicines ?

Answer. I have reason to believe that some of them do ; but we have many commission houses conducted by highly respectable and honorable merchants, who have expressed themselves as opposed to that trade, and in favour of an appeal to Congress for the passage of a law prohibiting the importation of that kind of merchandise, not only as a matter of interest, but from principle ; of interest, because they well know they would receive a larger *amount* of consignments in that class of merchandise, if good and pure articles were sent them, instead of the spurious and comparatively worthless.

Why has this base traffic been allowed to continue so

long without a public expose, and some attempt being made at New York to arrest its progress?

Answer. Attempts have been made. The New York College of Pharmacy have for years been engaged in the endeavour, by force of reason, to put a stop to the trade in these adulterated articles, as far as facts came before them. The medical profession have been awake to the vital importance of the subject, but, until some eighteen months past, there has been no person in charge of that branch of trade in the custom-house who had a practical knowledge of drugs and medicines in their composition, &c., from whom any data could be obtained showing the extent of these frauds.

The Hon. Jno. C. Spencer, when Secretary of the Treasury, was appealed to, to remedy the deficiency the profession felt to exist in the customs. He replied most favorably, but as the request was made about the time he retired from that office, he could not carry these wishes into effect. The present Secretary of the Treasury was next appealed to, and promptly entertained the subject as one of great importance, and did not lose sight of it until effective measures were taken, at his request, to fathom the depth of the evil complained of."

ART. XLIV.—OBSERVATIONS ON THE MANUFACTURE OF CHLOROFORM.

By KESSLER, LAROCQUE, and others.

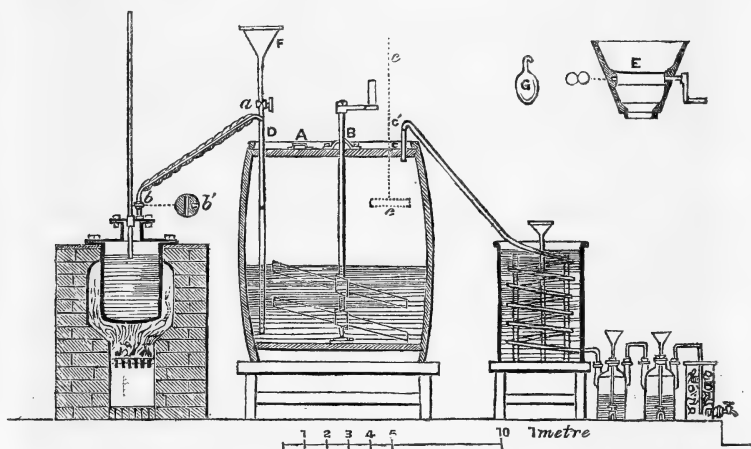
BUT a short time has elapsed since chloroform was considered a chemical curiosity, of no value in a practical sense, and only interesting to the philosophical enquirer. The observations of Dr. Simpson having brought it into notice as a remedial agent, its other properties have been more or less developed, and notwithstanding, at present, its character as an anesthetic and sedative is less brilliant than at first it appeared, the world will, at least, have to thank Dr. S. for bringing it into notice, if it is only as a solvent.

Chloroform appears to possess remarkable powers as a solvent for the carbohydrogen substances of the caoutchouc class, including gutta percha, which it dissolves with perfect ease, as well as gumlac, copal, &c., and there cannot be a doubt that this power will render it of great value as a menstruum, in very many processes of manufacture.

The solution of purified gutta percha in chloroform, has some pretensions to a plastic application in surgery. When applied to the skin, a few minutes suffices to obtain a uniform coating of the dissolved substance, of any required thickness, and from which the whole of the chloroform has evaporated. The various uses to which gutta percha has already been applied, will be greatly extended by this chloroformic solution, which may be applied as a varnish to cloth, paper, or other tissues, rendering them impervious to water, and yet flexible. According to MM. Larocque and Huraut, chloroform also dissolves bromine, iodine, the essential oils, the vegetable alkalies, and the fats.

Its use in the arts, however, to any extent, will depend mainly on the cheapness of production to which its manu-

facture may be carried. M. Louis Kessler, in a communication published in the *Journal de Pharmacie* for March, gives some satisfactory results as obtained in the laboratory of MM. Wœhrlin and Kessler, of Strasburg, the facts of which we now offer, together with a figure of the apparatus employed.



The cylinder or vessel to contain the materials for generating the chloroform, was first constructed of lead, but subsequently a strong wooden cask was employed, with the same success, which is figured above. The cask is placed on a suitable frame, on one of its ends; through the centre of the upper head passes an axle B, the joint air tight, the lower end entering a cap attached to the lower head, which axle has four arms, and is caused to revolve at will, by a crank. At A is a large opening, by which the chloride of lime and water are introduced. Another and much smaller one gives passage to the lead tube c c' designed to conduct away the vapours, whilst the other side is pierced by the hole D, traversed by a lead tube of larger diameter, which communicates at will with the funnel at F and the small iron boiler, by means of the two stopcocks, a and b, of

which one *b b'* is so constructed as to communicate with the air, whilst it closes the connection of the boiler with the cask. A glass tube is adjusted in the boiler to indicate the pressure, and for supplying the boiler with water. The tube *c c'* is attached to the worm of a refrigeratory, the inferior extremity of which is connected with a kind of Woulf's apparatus, the first bottle acting as the receiver, the second is half full of alcohol, and the last filled with cotton saturated with alcohol. Each of them is furnished with stop-cocks, and long necked funnels, by aid of which you can empty or fill them at pleasure, without disarranging the apparatus.

The operation proceeds with great readiness as follows: The cask or generator should hold eighty gallons. Ninety-two pounds of chloride of lime are introduced by means of the wooden funnel *E*, which is adjusted on the orifice *A*. The interior of the square funnel is traversed by two horizontal rollers, which, when turned, carry the chloride downward, and crush the lumps. Twenty-seven gallons of water, at 176° to 194° Fahr., are then added by the same opening, and the mixer, *B*, turned until they are thoroughly mixed. Immediately after, four and three-quarter pounds of alcohol is added, together with the alcoholic residues, and mingled. Ordinarily, the reaction is produced immediately, the chloroform distilling rapidly. If the contrary is the case, a jet of steam from the boiler is allowed to pass into the cask, by closing the cock *a* and opening *b*. As soon as the first products begin to appear, the steam is shut off at *b*, whilst *a* is again opened. From this time the progress of the operation should be regulated by the flow of the liquid in the recipient, and the rapidity of the escape of gas bubbles through the alcohol. The violence of the reaction may be easily controlled by adding a portion of cold water by the funnel *F*, and moving the mixer. To be fully assured that the contents of the cask do not pass over into the worm, a cork float

with a long rod e , passes through the barrel by a smooth tight joint.

As soon as you see the disengagement of the chloroform becomes calmer, and you judge the reaction has almost terminated, you suffer the steam again to enter the cask, and continue the heat, thus created, until six and a half pints of liquid has distilled. The cask is now emptied by a lateral inferior opening, the clear liquid used for a second operation, with a proper addition of water and another charge of chloride. The alcohol and chloroform contained in the two last bottles, is added with the alcohol, to the second charge. The crude chloroform is purified by agitating it first with a solution of carb. soda, and then with three or four times its weight of water. It is then distilled from chloride of calcium, and the product is chloroform, equal to six or eight per cent of the chloride employed, and free from acetic ether, water and alcohol.

MM. Larocque and Huraut, have suggested (*Jour. de Pharm.* Feb. 1848,) that the addition of quicklime greatly advantages the process. In operating with ten pounds of the chloride, five pounds of lime are added. The reason for adding the lime, is to prevent the corrosion of the vessels by the chlorine, which is absorbed by the lime, and gives an increased amount of chloroform. The following shows the products of four consecutive operations.

1000 parts chloride yielded 55 parts chloroform.

“ “ “ 64 “

“ “ “ 70 “

“ “ “ 73 “

$$4000 \quad \dots \quad 262 = 6\frac{1}{2} \text{ per cent.}$$

According to these gentlemen, it costs one dollar and thirty-one cents per pound to make it, estimating chloride of lime at five and one-fourth cents per pound, lime at half cent per pound, alcohol fifty-four cents per gallon, fuel at one half the cost of the alcohol, and labour, and wear and

tear of vessel, at one dollar twelve and a half cents per day. They think the process can yet be modified so as to make it much cheaper.

MM. Larocque and Huraut, suggest that bichloride of tin is a contamination of chloroform, made in tinned vessels, and attribute to that substance a part of the irritating properties of some specimens of chloroform.

ART. XLV.—NOTE ON CHERRY LAUREL WATER.

BY M. DESCHAMPS (D'AVILLON.)

CHERRY laurel water being placed amongst those distilled waters which it is necessary to preserve with care, because it contains a certain amount of hydrocyanic acid, which has a tendency to decomposition by light and age, I have thought that it perhaps would not be useless to determine whether it is indispensable to cut and bruise the cherry laurel leaves destined for the distillation, which is not recommended by all the formulæ known, and also to ascertain if any advantage would arise from the employment of sulphuric acid in the preservation of this water, as it enjoys the property of giving stability to hydrocyanic acid.

With the view of resolving these two questions, I prepared on the 3d of July, 1846, cherry laurel water with the entire leaves, and with those that were cut and bruised.

The water prepared with the entire leaves, notwithstanding a previous maceration of eighteen hours, contained thirty-one per cent. less hydrocyanic acid than that obtained from the bruised leaves.

The water prepared with cut and bruised leaves was di-

vided into parts, and each part was placed in three ounce (100 grammes) vials.

Vial No. 1 had 1 drop of pure sulphuric acid added to it.

"	2	"	$\frac{1}{2}$	"	"	"	"
"	3	"	$\frac{1}{4}$	"	"	"	"
"	4	"	$\frac{1}{5}$	"	"	"	"
"	5	had no addition ; kept in a dark place.					
"	6	"	"	vial not full ; kept in a dark place.			
"	7	"	"	kept in the shop.			
"	8	"	"	vial not full, and kept in the shop.			

The water after the distillation contained .00105 per cent. of hydrocyanic acid, (30 grammes, contained .0316 grammes.) Eleven months after its preparation,

Water in No. 1 contained .00106* per cent. of Prussic acid.

"	"	2	"	.00106	"	"
"	"	3	"	.00106	"	"
"	"	4	"	.00106	"	"
"	"	5	"	.00066	"	"
"	"	6	"	.00083	"	"
"	"	7	"	.00090	"	"
"	"	8	"	.00090	"	"

The facts contained in this note give the right to infer that it is necessary to cut and bruise the cherry laurel leaves before subjecting them to distillation ;

That the proportion of hydrocyanic acid contained in this water diminishes with age ;

That we can tell that this water has been properly prepared, when it contains .00066 per cent. after being kept eleven months ;

*These results make it appear that the water to which the acid has been added, contained more hydrocyanic than the original distilled water. This discrepancy is due to the manner of conducting the analysis, the last filters being adjusted by a filter weighed and tared similar to the one used in ascertaining the per centage of acid in the distilled water.

That by adding one-fifth, to one-fourth of a drop of sulphuric acid for every three fluid ounces of the distilled water, all the hydrocyanic acid it contains may be preserved for at least one year.

That this minute quantity of sulphuric acid cannot be injurious in the medical employment of this distilled water; and, that it is easy to understand, especially after having studied the published formulæ for preparing this water, why therapeutists have not agreed as to its efficacy, since the hydrocyanic acid diminishes with age. Some may have made their trials with the water of the Codex of 1837, which is prepared by obtaining a quantity of product, by distillation, equal to the weight of the leaves employed, whilst others may have experimented with the water of the Codex of 1818, in which but one half as much water is obtained from the same quantity of leaves. Or it may have been that the waters were prepared by the formulæ of foreign Pharmacopœias, which are a great deal more or less impregnated than that of the French Codex. The waters of some of the shops, contain little more than .0005 per cent., ten months after their preparation.

[There appears to be much truth in the above observations of M. Deschamps, and we have introduced them from the *Journal de Pharmacie*, not so much from their bearing on the distilled water in question, which is rarely used in this country, as illustrative of the preservative influence of the mineral acids over solutions of hydrocyanic acid.

The syrup of wild cherry bark contains prussic acid under the same circumstances as the cherry laurel water, except that it is associated with sugar, which may or may not retard the decomposition or loss of that acid. It becomes, therefore, a question worthy of examination, whether the addition of one drop of sulphuric acid to each pint of wild cherry syrup, will not prove useful, by increasing the stability of the preparation.—ED.]

ART. XLVI.—ON A METHOD OF DETECTING THE PRESENCE OF SULPHATE OF CINCHONINE IN THE SULPHATE OF QUININE, AND OF ESTIMATING ITS AMOUNT.

By O. HENRI.

HAVING been requested to analyse several samples of sulphate of quinine from various sources, with a view to detect any sulphate of cinchonine, supposed to exist in them to a considerable amount, I had occasion to make various experiments, the publication of which may prove useful.

As is well known, cinchonine always accompanies quinine in the barks. Although its medical properties have a certain analogy with those of quinine, they do not possess the same energy; and, moreover, as the proportions of sulphate of cinchonine mixed with that of quinine are variable, and, as I have had occasion to find, frequently vary considerably, the sulphate of quinine can no longer possess the same intensity in its medical action nor the same constancy in its effects. In the preparation on a large scale of the sulphate of quinine, that of cinchonine, being far more soluble, remains in the mother-ley, and mere traces can adhere to the former. Now when we find sulphate of cinchonine, to the amount of 4, 6, 8, 10, 15, &c. per cent., there can be no doubt that it has been added fraudulently.

To detect the presence of sulphate of cinchonine in sulphate of quinine, I first tried the processes proposed by Mr. Calvert and by M. Oppermann. The first of these processes consists in adding to a solution of the suspected sulphate of quinine a solution of chloride of lime (hypochlorite.) The sulphate of quinine gives at first a white precipitate, but the deposit dissolves in an excess of the reagent; whilst the sulphate of cinchonine yields, *according to the author*, an abundant precipitate, which is permanent. In the second process, that of M. Oppermann, a suitable

amount of sulphate of quinine is dissolved in tartaric acid; it is diluted from two hundred to three hundred parts of pure water, and an excess of bicarbonate of potash or soda added. Under the influence of the tartaric acid, M. Oppermann states that the quinine does not yield any precipitate, whilst the other base gives an abundant deposit.

I have several times repeated these two processes, and must confess that I found them totally deficient in accuracy; for in the first the chloride of lime, whilst forming with the sulphate of cinchonine a more apparent precipitate, did not the less dissolve the whole when added in sufficient excess. With respect to the second, the bicarbonates of potash and soda equally furnished abundant precipitates, which was formed more or less slowly in the tartaric solutions. Sometimes I obtained no precipitate either in one or the other salt. The want of success which I experienced, induced me to follow a different method, which, although requiring more time, leads, when *carefully* made, to very good results, according to experiments which I have made upon mixtures of sulphates of quinine and cinchonine in the proportions of 2, 4, 10 and 15 per cent. of the latter.

From twenty to thirty grms. of the sulphate of quinine to be examined are dissolved in a certain quantity of distilled water slightly acidulated, and an access of caustic soda added to the solution. The collected and washed precipitate is saturated with hot acetic acid; the mixture solidifies on cooling to a crystalline mass, which is thrown upon a filter of fine linen and expressed; the clear solution evaporated to one half, yields on cooling more crystals, which are separated in the same manner. The mother-water is then decomposed again with dilute caustic soda, and the precipitate formed is, after washing, treated in the cold either by ether or by alcohol of 0.923. After this treatment, it is boiled twice, or more frequently, in absolute alcohol, and filtered boiling hot. The alcoholic solution, evaporated with care and to dryness, leaves the cinchonine in minute

acicular crystals, which can be weighed. This method, which it is true is somewhat tedious, is successful with mixtures containing only 2 per cent. I obtained very satisfactory and closely approximative results.—*Journ. de Pharm.*

ART. XLVIII.—ON THE PREPARATION OF KERMES MINERAL.

By M. LIANCE, Pharmaceutist, Paris.

IT is very usual in this country to consider kermes mineral and precipitated sulphuret of antimony, as synonymous names, and hence it is generally the case that a physician who prescribes the former, gets the latter or officinal oxy-sulphuret of antimony. In France, the form of kermes mineral is preferred, and it is usually made by the process of Cluzel, which is extremely simple, though not very productive, when the amount of liquid operated with is considered. In fact, the preparation of kermes in such a manner as always to have a beautiful and uniformly active product, has not been generally understood, and M. Liance has long been the manufacturer of an article specially esteemed. This gentleman, in a communication to the Society of Pharmacy at Paris, has given to the world his processes, which are explained in the following report of M. Dublanc to the Society, viz :

“GENTLEMEN,—In order to report on the note that M. Liance has addressed to you on the preparation of kermes, I will not write the history of this medicine. It has been the object of so many researches, experiments, and theories, that I found myself entangled in tedious developments and lengthy discussions, without deriving any advantage in

reference to the practical points in its manufacture, which have engaged our honorable associate.

“Since Legerie made known to Simon, an apothecary of the Carthusian friars, the powder, the composition of which he himself had derived from a pupil of Glauber, the celebrity of kermes was acquired by the marvellous cases of cures of the most hopeless diseases of the chest, which followed its use. The secret of the composition of kermes was bought in 1720, by Philip of Orleans, then Regent of France, and published by order of the King. On this occasion a discussion on the priority of the discovery arose in favour of Lemery, who had mentioned a product obtained by means of sulphuret of antimony in powder, and *oleum tartari per deliquium*. That which is authentic in regard to the origin of kermes and its introduction into practice, is, that it was the process sold by Legerie, and printed in the *Codex* which was followed for a long time, confirming the high reputation of its product, by the uniformity of its medical effects.

“According to the particular notices of different authors who have written on the preparation of kermes, very numerous modifications have been introduced in the first formula. It has resulted, that the products corresponding to these modifications, and called kermes, are more or less different in their medical properties, from the Carthusian powder. This state of things has been remarked, and gave rise to a fear that the original [heroic] medicine had been lost.

“It was with the intention of doing away with the uncertainties in the preparation of kermes, that Cluzel undertook a series of experiments, full of interest, on these mixtures, varying in nature and proportion, and that he published a formula (*Annales de Chimie* t. lxiii,) to which he attributes the desirable advantage of furnishing a product gifted with the most beautiful physical characters, and constant physiological effects.

“This process of Cluzel, which really gives a very satisfactory preparation, has been adopted to the exclusion of all others, by pharmacutists, chemists, and all those who occupy themselves with the manufacture of kermes, but it is necessary to conform exactly and definitely to the letter of the formula, to render the medicine identical and stable in its action. It is very important that a resolution to conform to correct principles be adopted in preparing this remedy, so that the various sources from whence the kermes of the shops is derived, should furnish a perfectly uniform agent.

“M. Liance has found himself in a situation favourable for ascertaining the numerous anomalies presented by kermes from various sources. The depositary, by succession, of a process which appears to have issued from the hands of Legerie himself, the experience of his predecessors and his own, has demonstrated to him the regularity of this process, its simple and easy execution, and the constant resemblance of the products obtained by it. This circumstance appears to have originated the confidence, accorded by many pharmacutists and manufacturers of chemicals, to the kermes, which has long been prepared by the house now directed by M. Liance.

“It is this process, gentlemen, that our cotemporary comes to make known, and to give you. The prejudice that will accrue to him by publishing a means of preparing a medicine for which he has an extensive sale, we think renders the act great and generous, considered with a view to the interests of humanity, of medicine, and of pharmacy.

“The process of M. Liance is divided into two operations.

First Operation.

Take of Refuse hair or horn,	2.2 lbs.
Carbonate of potassa,	4.4 lbs.

“Arrange in a crucible in alternate layers, refuse hair and alkali, about one-third to two-thirds of an inch thick, let the last stratum be a thick one of carbonate, cover the crucible

carefully and heat gradually, until the calcined matter enters into complete fusion, and ceases to disengage gas. It is then poured out to cool on a stone, and is preserved for use. The cold product is solid, without odour, of a greyish white, and very deliquescent.

Second Operation.

Sulphuret of antimony in fragments,	33.08 lbs.
Pure carbonate of potassa,	17.61 lbs.
River water,	13.0 galls.

“Divide the antimony in splintery fragments without pulverizing, put it in an iron boiler, throw the water on it, and add 4.4 lbs. of carbonate of potash and one-fourth part of the *first preparation*, carry the heat to ebullition and continue it during three quarters of an hour or an hour, and then diminish the fire. Filter the liquid through cloths covered with unsized paper, and receive the filtered liquid in an earthen vessel previously heated. The whole filtered product is thrown into two large cylindrical earthen pots, also heated, carefully covered, and left till the next day.

“This operation terminated, the boiler is replenished with water, 4.4 lbs. of carbonate of potash, and a second-fourth of the first preparation added. The boiling is then continued for an hour, filtered, and, in fact, the same process as before noticed gone through with, and the liquor placed in two other cylindrical pots.

“The operation is repeated twice more until all the first preparation is consumed, when there will be eight pots.

“The next day after, the liquid is decanted from the two first pots into the boiler, which is then filled with water, and without further addition, is boiled an hour, filtered and placed in the pots from which it was taken, the first deposit having been previously removed to a proper vessel.

“The other pots are decanted successively, and the series of operations kept up for a month, observing to add $\frac{1}{2}$ lb.

of carbonate of potash to each of the four series of operations every five or six days, as the proportion of alkali diminishes, else the beauty of the product is impaired.

"The deposits from the different pots having been received every day into the same vessel, are thrown on to a cloth covered with filtering paper. When the liquid ceases to drop, the precipitate is washed with cold boiled water till free from adhering alkali, and afterwards enveloped in brown paper and dried at a temperature of 60° or 65° Fahr. It is very important that the temperature be very moderate and always equal, because experience has proved that without this precaution, the product is less beautiful.

"When sufficiently dried, the kermes is triturated in a marble mortar, passed through a silk seive, and preserved in earthen pots or glass bottles, protected from the light.

"We have repeated the process of M. Liance with the minutest exactness; we have also thought proper to assist at an operation conducted by himself in the midst of his laboratory, and aided by its utensils, because we know that with all operators there are certain slights-of-hand in the success of the operation.

"In one or the other case by ourselves, or by M. Liance, we have obtained products that have appeared to us to unite all the desirable qualities. Thus the kermes yielded by this process is light, presents the beautiful colour that gives it name, and has the velvety aspect which is one of the essential requisites."

The reporter further states that he has not investigated the part that is acted by the preparation of potassa, nor has he given a chemical comparison of the composition of Liance's kermes with that of Cluzel, as to their richness in oxide of antimony. He recommends that their relative therapeutic virtues should be tried by parallel sets of experiments.

Cluzel's process requires that one part of finely powdered

sulphuret of antimony be boiled for half an hour, with a solution of 22.5 parts of carbonate of soda in 250 parts of water, filtered hot, cooled slowly and washed with cold boiled water and dried in the dark.

ART. XLIX.—OBSERVATIONS UPON CRYSTALLIZED AND AMORPHOUS QUININE AND CINCHONINE.

By M. WINCKLER.

THE results which the author has arrived at are of great interest, especially to pharmacologists, as they enable us to form a more accurate opinion of the value of quinoidine as a therapeutical agent. Winckler had occasion to observe that the crystallized cinchonine was converted into amorphous by the action of an excess of sulphuric acid, and at the same time found in the hyposulphite of soda a means of separating crystalline from amorphous quinine and cinchonine. According to his experiments, quinoidine contains amorphous quinine and cinchonine in variable proportions, according to the duration of the action of the acid in the preparation of these alkaloids and the nature of the barks. These results confirm, on the one hand, what Liebig first stated respecting the nature of quinoidine; and on the other, besides the discovery of amorphous cinchonine, point to those conditions by which, in the preparation of these alkaloids, the amorphous state may be avoided.

Some amorphous cinchonine was accidentally formed in the preparation of the sulphate of cinchonine, by adding a rather large quantity of concentrated sulphuric acid at once to the hot mixture, and then heating it somewhat strongly.

In consequence of this treatment only one-third of the cinchonine separated subsequently in coloured crystals. On the subsequent addition of alkalies, a dark brown extremely-bitter substance resembling turpentine subsided, the solution of which in sulphuric acid was sent to the author for examination. The solution was diluted with water, filtered and mixed with an excess of carbonate of soda. The separated mass was again dissolved in dilute sulphuric acid, treated as before with carbonate of soda, and now some sulphate of soda added to it, while the liquid was heated in the water-bath. On cooling, a considerable quantity of a nearly black mass had separated, while the supernatant liquid was pale brown. On the addition of ammonia, this liquid now deposited an almost perfectly white pulverulent precipitate, which gradually aggregated to a dark yellowish-brown turpentine-like mass, which after sufficient washing with water was dried in the water-bath. In this state it exactly resembled the syrupy coloured residue, insoluble in pure ether, which remains when the extract of quinoidine with ordinary ether is treated after evaporation of the latter with ether containing no water or spirit. Both were dissolved in absolute alcohol, and digested with animal charcoal at 104° , upon which both solutions were evaporated in the water-bath until their weight no longer varied. In this state both substances formed dark brown tenacious masses, which in thin layers were transparent, and which possessed an odour similar to commercial quinoidine. They dissolved in every proportion in strong alcohol, but not in ether and water. Equal quantities of the two substances saturated the same amounts of dilute acids, and were so completely precipitated from the solutions by carbonate of soda, that the liquid, after removal of the precipitate, was nearly void of taste and colour. Both substances behave precisely similar on being heated; they first melted, then disengaged some vapours of a bitter taste, and left a cinder which burnt without any residue, but with considerable

difficulty. On cautiously heating some in a glass tube, a sublimate of crystals was obtained, which were exactly like those formed under similar circumstances from cinchonine. The peculiar odour of quinoile, which is perceived on heating crystallized and amorphous quinine, could not be observed. From solutions of the same amount of the two substances in muriatic acid, the author obtained the same weight of the insoluble platinum double salt, when an excess of chloride of platinum was poured into the solutions, which precipitated the whole of the organic substance from the liquids; however, the salts differed somewhat in their state of aggregation; that from quinoidine was of a bright yellow and loose, that from cinchonine was darker and more pulverulent crystalline. The double salt from cinchonine left on ignition 24.15 per cent., that prepared from quinoidine 23.35 per cent. of platinum. The author is thence led to believe that quinoidine (amorphous quinine and cinchonine) is formed by the action of acids upon the alkaloids in their preparation. He believes that quinine is not so readily converted by acids into amorphous quinine, as cinchonine, and a quinoidine containing but little or no amorphous quinine, is probably obtained in preparing a sulphate of quinine from barks containing both alkaloids.

Hyposulphite of soda immediately precipitates hyposulphite of quinine, in the form of a dazzling white crystalline precipitate, from the solution of the muriate of quinine; cinchonine separates under similar circumstances in four-sided needles. Both salts disengage sulphuretted hydrogen and sulphurous acid, when concentrated sulphuric is poured over them. When treated with dilute sulphuric acid, they are converted into sulphates, with evolution of sulphurous acid and elimination of sulphur. The amorphous alkaloids, when saturated with muriatic acid, do not yield these precipitates. The author turns this reaction to account in de-

tecting the presence of crystalline alkaloids in quinoidine, and draws attention to the hyposulphites of the other vegetable bases.—*Chem. Gaz., from Jahr. für Prakt. Pharm.*

ART. L.—ON THE DIGESTION OF ALCOHOLIC DRINKS,
AND THEIR FUNCTION IN NUTRITION.

BY MM. BOUCHARDAT and SAUDRAS.

THE authors have performed a series of experiments, with the view of ascertaining the mode in which alcohol is absorbed, and the changes which it undergoes in the system. The first experiments were made upon dogs, which were killed two hours after the administration of a quantity of alcohol. The chyle and blood were separately examined for that fluid, which was found totally absent in the former, but present in minute quantity in the latter. Acetic acid was also detected in the blood by distillation with sulphuric acid, after the separation of the alcohol which it contained.

Owing to the difficulty in getting dogs to take spirituous fluids, they afterwards made use of fowls and ducks; and it was found that, in most cases where the blood was taken sufficiently soon after the administration of the alcohol, both that substance and acetic acid could be detected in it in minute quantity. Very rapid absorption also takes place, and in one experiment the authors found that three-fourths of the spirit administered was absorbed in less than twenty minutes.

It was then ascertained that the quantity of alcohol which escapes by the lungs is quite inconsiderable. This was

determined by directing the gases and vapours evolved during respiration by a man who had taken a considerable dose of alcohol through a Woulff's bottle, surrounded by a freezing mixture. After the operation had been conducted for two hours, only a minute quantity of alcohol was found in the condensed fluid. None escaped by the urine or other secretions.

In the case of a man who, after a three days' debauch upon strong punch, was seized with a succession of epileptic fits, they found that blood drawn immediately from the jugular vein contained both alcohol and acetic acid in small quantity, while that taken an hour later contained none. They found, however, by Trommer's test, distinct indications of the sugar which had been present in the punch, from which the authors draw the conclusion, that alcohol is digested more rapidly than sugar.

From these experiments the authors conclude that alcohol is absorbed by the veins, and not by the lacteals; and that, with the exception of the small quantity which escapes by the lungs, it is entirely oxidized into carbonic acid and water, either directly or by passing through the intermediate stage of acetic acid.—*Ib.*, from *Ann. de Chim. et de Phys.*

ART. LI.—ON THE BEHAVIOUR OF VEGETABLE CHARCOAL
TOWARDS CHLORINE, IODINE, BROMINE, CHLORIDE OF
LIME AND HYPONITRIC ACID.

BY PROF. C. F. SCHÖNBEIN.

VEGETABLE charcoal destroys ozone very rapidly. The resemblance which ozone bears to chlorine, iodine and bromine led to the following experiments :—1. When so much chlorine is mixed with atmospheric air that the gaseous mixture appears yellowish, instantly colours iodine of potassium paste blackish-blue, and immediately bleaches indigo paper, —the chlorine instantly disappears on shaking the gas with charcoal powder. 2. When chlorine is passed through a glass tube filled with charcoal powder, the charcoal becomes heated; and only when this has extended throughout the whole length of the charcoal, does the chlorine make its appearance at the other end of the tube. The charcoal thus treated does not evolve the odour of chlorine, and when exposed to the air, gives off muriatic acid vapours; when treated with water, it does not part with chlorine, but only with muriatic acid; nor does it disengage chlorine when heated, but it decomposes iodide of potassium, destroys indigo, and turns tincture of guaiacum blue; this property, however, it loses by long exposure to the air. 3. When chlorine water is shaken with charcoal powder, it is quickly deprived of its colour, odour and bleaching power, and the liquid contains muriatic acid. 4. The same is the case with a solution of the hyperchlorite of lime. 5. The brown liquid from peroxide of manganese and muriatic acid is quickly decolorized by being shaken with charcoal powder, and deprived of its odour and bleaching power, that is to say, the chloride of manganese is reduced to protochloride. 6. The most dense atmosphere of bromine vapour is absorbed by

charcoal powder even at a temperature of 212° . If charcoal powder and liquid bromine are quickly triturated together, but little bromine is lost; most of it is absorbed by the charcoal, which does not part with any bromine at 212° , but only at a higher temperature. 7. An aqueous solution of bromine is wholly deprived of its bromine by charcoal powder. 8. Vapours of iodine are quickly absorbed by charcoal powder even at 212° ; when one part of iodine is triturated with nine parts of charcoal powder, this mixture does not disengage a trace of iodine even at 212° . This combination of iodine and charcoal turns guaiacum tincture blue, just as iodine. Brownish-yellow iodine water can be instantly and entirely decolorized by charcoal powder. 9. Schönbein had previously shown that charcoal powder eliminates hyponitric acid from the first hydrate of nitric acid without any carbonic acid being formed. The author explains this according to his view of the constitution of nitric acid, assuming that the hydrate of nitric acid $= \text{NO}^4 \text{HO}^2$ is separated into NO^4 and HO^2 , when the HO^2 is decomposed without carbonic acid being produced. When a glass tube is filled with a mixture consisting of nine parts of water and one part hyponitric acid, a violent disengagement of nitric oxide results, but no carbonic acid is formed. *Ibid, from Poggendorff's Annalen.*

ART. LII.—NOTES ON THE ANÆSTHETIC EFFECTS OF CHLORIDE OF HYDROCARBON, NITRATE OF ETHYLE, BENZIN, ALDEHYDE, AND BISULPHURET OF CARBON. By J. Y. SIMPSON, M. D., Professor of Midwifery in the University of Edinburgh.

DURING the last few months, two or three different substances have been mentioned as additional anæsthetic agents: but our medical journals have afforded little or no detailed notice of their effects. The few following notes, however imperfect, may not therefore be uninteresting; more particularly as they are the result of direct experiments upon myself and others with the agents in question. In most of these experiments, I had the kind and able assistance of Dr. Keith and Dr. Duncan.

When first publishing, in November last, upon the anæsthetic properties of chloroform, I stated that, "in making a variety of experiments upon the inhalation of different volatile chemical liquids, I have, in addition to perchloride of formyle, breathed chloride of hydrocarbon, acetone, nitrate of oxide of ethyle, benzin, the vapour of iodoform, &c. I may probably (I added) take another opportunity of describing the result." (See *Lancet* for 20th November, 1847, p. 549.)

Three of the substances which I named in the preceding list, produce, when inhaled, a state of anæsthetic insensibility, viz., chloride of hydrocarbon, nitrate of oxide of ethyle, and benzin.

Chloride of Hydrocarbon.—Chloride of Hydrocarbon, or Dutch liquid, as it is often termed, in consequence of being first discovered by the Dutch chemists of the last century, is one of the various fluids to which the name of *chloric ether* was for some time given.

When equal parts of olefant gas and chlorine are mixed

together, the two gases rapidly disappear, and produce a colourless oily liquid, of a peculiar sweetish taste and ethereal odour. Its specific gravity is 1.247. It boils at 148° . It is composed of four atoms of carbon, four of hydrogen, and two of chlorine. Hence its formula is $C^4 H^4 Cl^2$.

When its vapour is inhaled, the chloride of hydrocarbon causes so great irritation of the throat, that few can persevere in breathing it for such a length of time as to induce anæsthesia. I have latterly, however, seen it inhaled perseveringly until this state, with all its usual phenomena, followed; and without excitement of the pulse, or subsequent headache. When I myself attempted to inhale the chloride of hydrocarbon, it produced an extreme degree of acrid irritation in the throat, which did not disappear entirely for many hours afterwards.

Nitrate of Ethyle.—When two parts of alcohol, and one part of pure nitric acid, are distilled together with the addition of a small quantity of urea, nitrate of ethyle, or more properly, nitrate of oxide of ethyle, is produced. It is a transparent colourless liquid, with a sweet taste, and very agreeable odour. Its specific gravity is 1.112; it boils at 185° . It is a compound of four proportions of carbon, five of hydrogen, six of oxygen, and one of nitrogen; and its formula is $(C^4 H^5) O, NO^5$, or $Ae O, NO^5$.

Nitrate of ethyle is easy and pleasant to inhale, and possesses very rapid and powerful anæsthetic properties. A small quantity, such as fifty or sixty drops, when sprinkled on a handkerchief and inhaled, produces insensibility after a few inspirations. But during the brief period which elapses before the state of complete anæsthesia is induced, the sensations of noise and fulness in the head are in general excessive; and much headache and giddiness have usually followed its employment, and persisted for some time.

Benzin.—Benzin or benzole was first discovered by Faraday, as one of the products in his experiments on compres-

sing oil gas, and was designated by him *bicarburet of hydrogen*. Mitscherlich afterwards obtained it by distilling, at a high temperature, benzoic acid with an excess of slaked lime.

It is a clear colourless liquid, of a peculiar ethereal odour, with a specific gravity of 0.85, and boils at 186° . It is believed to be composed of two proportions of carbon and one of hydrogen. Its formula is $C^2 H$; or perhaps, more properly, $C^{12} H^6$. It is polymeric with the hypothetic radical formyle.

In my experiments with benzin, I found it capable of producing anæsthesia; but the ringing and noises in the head accompanying and following its inhalation were so excessive, and almost intolerable in the case of myself and others, as to seem to us to render its practical applications impossible, even had there been no other objections to its use. Latterly, Dr. Stow has tried its employment upon some patients for tooth drawing, and in one instance of amputation. In this last case it produced convulsive tremors.—*Lancet* for 12th February, 1848, p. 180.)

Aldehyde.—Aldehyde or hydrate of oxide of acetylene, was first noticed by Dœbereiner, in distilling together sulphuric acid, alcohol, and peroxide of manganese, but it was left for Liebig to fix and determine every thing about its chemical nature. It is a colourless limpid liquid, of specific gravity 0.791. It is very volatile, boiling at 72° . It spontaneously changes when long kept, and is converted into two substances, a solid and a fluid, metaldehyde and elaldehyde. Liebig found it to be composed of four atoms of carbon, four atoms of hydrogen, and two of oxygen, and its formula is $C^4 H^3 O + aq$.

Professor Poggiale, of Paris, has lately made some experiments with dogs on the inhalation of the vapour of aldehyde, and from these has concluded that its anæsthetic effects will be found more prompt and energetic than those of sulphuric ether or chloroform. It certainly possesses,

like some of the preceding agents, well-marked anæsthetic properties, but it assuredly will never come into use, as very few will be found capable of inhaling a sufficient dose of its vapour. In fact, out of five of us that attempted to inhale aldehyde, very carefully prepared and purified, four were driven to suspend the respiration of it in consequence of the coughing and insufferable feeling of dyspnœa which it immediately induced. The sensation of difficult respiration and constriction in the chest which the vapour produced, resembled precisely those of a severe fit of spasmodic asthma. In the fifth case, the experimentalist, after perseveringly breathing the aldehyde for a minute or two, became entirely insensible; the state of anæsthesia lasted for two or three minutes, during which the pulse became excessively small and feeble. On recovering, the bronchial constriction and coughing, which had disappeared as the anæsthesia was induced, returned immediately, and was annoying for some time.

Bisulphuret of Carbon.—Bisulphuret of carbon, or alcohol of sulphur (as it was at first termed) was accidentally discovered in 1796, by Lampadius, when experimenting on iron pyrites. Different opinions of its composition were held by different chemists, but Berzelius and Marcet in 1813, at last fully confirmed the previous idea of Clement and Desormes, Vauquelin, &c., that it consisted only of sulphur and carbon. It is composed of two atoms of the former to one of the latter, consequently its formula is $C S^2$.

The most easy method of procuring it is by transmitting the vapour of sulphur over fragments of charcoal heated to redness in a closed porcelain or iron tube. The resulting bisulphuret of carbon, when purified by distillation, is a clear, colourless liquid of a pungent taste. Its specific gravity is 1.272. It is very volatile, boiling at 108° .

It has been stated in various literary journals, that bisulphuret of carbon has lately been used as an anæsthetic agent at Christiana; but no particulars regarding its employment in Norway have, as far as I know, been yet published.

I have breathed the vapour of bisulphuret of carbon, and exhibited it to about twenty other individuals, and it is certainly a very rapid and powerful anæsthetic. One or two stated that they found it even more pleasant than chloroform; but in several it produced depressing and disagreeable visions, and was followed for some hours by headache and giddiness, even when given only in small doses. In one instance I exhibited it, with Mr. Miller's permission, to a patient, from whom he removed a tumour of the mamma. It very speedily produced a full anæsthetic effect; but it was difficult to regulate it during the operation. The patient was restless in the latter part of it; but felt nothing. Like several others when under it, her eyes remained wide open. After the operation she was extremely sick, with much and long-continued headache; and, for fifty or sixty hours subsequently, her pulse was high and rapid, without rigour or symptoms of fever.

I tried its effects in a case of midwifery, in presence of Dr. Weir, Dr. Duncan, Mr. Norris, and a number of the pupils of the Maternity Hospital. It was employed at intervals during three quarters of an hour. The patient was easily brought under its influence, a few inspirations sufficing for that purpose; but it was found altogether impossible to produce by it the kind of continuous sleep attending the use of chloroform. Its action was so strong, that when given, as a pain threatened or commenced, it immediately affected the power of the uterine contractions, so as often to suspend them; and yet its effects were so transient that the state of anæsthesia had generally passed off within a minute or two afterwards. The patient anxiously asked for it at the commencement of each pain. During its use she was occasionally sick, and vomited several times. Lastly, her respiration became rapid, and her pulse rose extremely high. I then changed the inhalation for chloroform, and, under it, the patient slept quietly on for twenty minutes, when the child was born. During these twenty

minutes, there was no more sickness or vomiting, and the pulse gradually sunk down to its natural standard; and a few minutes after the child was expelled, and while the mother still slept, her pulse was counted at 80. Next day the mother and infant were both well, and she has made a good recovery.

While these experiments prove the strong anæsthetic properties of bisulphuret of carbon, they at the same time show its disadvantages. I have not alluded to another strong drawback upon its use, viz., its very unpleasant odour. "It has (says Dr. Gregory) a peculiarly offensive smell of putrid cabbage."—(*Outlines of Chemistry*, p. 130.) By dissolving various essential oils in the bisulphuret I tried to overcome this disagreeable defect, but without much success.

None of the five anæsthetics which I have mentioned in the present communication, are, I believe, comparable with chloroform or sulphuric ether, either in their manageableness or in their effects. And the after-consequences which all of them tend to leave, are too severe and too frequent to admit of their introduction into practice. They are more interesting physiologically than therapeutically.—*Pharm-Journ., from Monthly Journ.*

ART. LIII.—ON A NEW PROCESS OF ENGRAVING UPON SILVER, SILVERED OR GILT COPPER, INVENTED BY M. POITEVIN.

BY M. BECQUEREL.

M. NIEPCE DE ST. VICTOR has discovered a very ingenious method of copying drawings and engravings upon paper, glass or plates of metal. M. Poitevin has converted these copies into plates engraved in relief and *intaglio*, after the manner of copperplate engravings, so that any number of proofs may be taken of them. Two or three hours suffice for the operation.

The engraving or manuscript to be copied is first exposed to vapour of iodine, which is deposited solely upon the black portions: the iodized engraving is then pressed gently upon a plate of silver or silvered copper, polished in the same way as for Daguerreotypes. The black parts of the engraving, which have received the iodine, transfer it to silver, the corresponding parts of which are converted into iodide. The plate, connected with the negative pole of a battery consisting of a few pairs, is then immersed for some minutes, in a saturated solution of sulphate of copper, which is connected with the positive pole by means of a strip of platinum. The copper is deposited only on those parts which are not covered with iodide, and which consequently correspond to the white portions. We thus obtain a perfect representation of the engraving, in which the copper represents the white, and the iodized silver the black parts. The plate must only remain a very short time in the bath of sulphate of copper; for if the operation were continued too long, the entire plate would become coated with copper.

The plate, after having received the deposit of copper, is very carefully washed, and then immersed in a solution of

hyposulphite of soda, to dissolve iodide of silver which occupies the place of the black parts; it is then washed with a large quantity of distilled water and dried. The plate is then heated sufficiently to oxidize the surface of the copper, which successively assumes different tints; when it exhibits that of a dark brown, it is allowed to cool; the silver exposed is amalgamated, heating the plate gently in order to facilitate the operation. As the mercury does not combine with the oxide of copper, we obtain an impression in which the amalgamated portions represent the blacks, and the parts of the plate covered by oxide of copper, the whites; when the amalgamation is finished, the plate is covered with two or three layers of gold leaf, and the mercury evaporated by heat; the gold consequently adheres solely at the places occupied by the blacks of the engraving. The gold which does not adhere is removed with a brush, which being done, the oxide of copper is dissolved in a solution of nitrate of silver, and the silver, as well as the copper which is beneath it, eaten away with dilute nitric acid. The lines of the drawing which are protected by the gold not being attacked, etchings of any depth, corresponding to the white parts of the engraving, may be obtained. When this last operation is done, the plate, which may be compared to an etched copperplate, is fit for taking proofs after the manner of wood engravings.

To obtain plates engraved after the manner of copperplates, it is requisite to operate on a gilt plate of copper. In the bath of sulphate of copper, the parts corresponding to the whites are again covered with copper; the iodine, or the iodine compound which was formed, is removed with hyposulphite; the layer of deposited copper oxidized; the gold amalgamated, which may then be removed with nitric acid, and at the same time the oxide of copper dissolved. In this way the white parts are evidently preserved, and the hollows represent the black portions, as in engraved copperplates.—*Chem. Gaz., from Comptes Rendus.*

Editorial Department.

Our subscribers will be gratified, we doubt not, with the increase of size exhibited by the present number of the Journal. The additional sixteen pages will allow of much extension in the subjects deemed worthy of insertion, and embarrass us less as regards the length of articles of high interest and importance. The concluding part of each number has hitherto been devoted to what has been termed Miscellany; to commence with this issue, an alteration, and, as we conceive, an improvement will be adopted, which will consist of a department as entitled above, the *Editorial*. This will give the conductors of the Journal greater latitude for the insertion of matters not so formal in their character as those heretofore constituting the miscellany, and at the same time enable them to indulge in comments or remarks, suggestive or interrogatory, upon every thing connected with the interests of pharmaceutical science, or the regulation and mode of conducting the business of pharmacy. Room will thus be afforded for a system of correspondence between ourselves and those who may seek or communicate information; or between those who may make the Journal an organ. It is very desirable that the only Journal of Pharmacy in the country should be considered as pertaining to the entire profession, and we now offer to all who may be interested in the progress of improvement, the facilities which such a publication affords.

The editor, who has previously appeared as the acting one, has been assisted by a committee of the College. Hereafter our colleague, Mr. Procter, will assume the responsibility of co-editor, and the same committee will continue its supervision.

J. C.

Our friend Edward Parrish has shown us a *Syrup of Citrate of Iron* which appears to be a good preparation. He first prepares a moist protocarbonate of iron, by mixing together solutions of sulphate of iron and carbonate of soda, precisely as directed for Vallet's ferruginous mass, and washing with sweetened water. This is then dissolved by means of a slight excess of citric acid in water, and evaporated to dryness. A greenish, deliquescent, freely soluble, uncrystallizable salt

results, the taste of which is ferruginous, but not very unpleasant. To make the syrup, one ounce (troy) of this salt is dissolved in five fluid ounces of simple syrup, which is easily effected, and forms a dark greenish-brown liquid. The dose is from thirty drops to a teaspoonful. The Syrup of Citrate of Iron of Beral is a saccharine solution of the citrates of ammonia and sesqui-oxide of iron

Mr. Parrish has also directed our attention to a prescription blank or form which he has published, of which the following is a copy, viz :

“ PRESCRIPTION.

		<i>Philadelphia,</i>	18
<i>For</i>	.....	.....
R			

The original of this prescription will be retained by the apothecary.”

These blanks are neatly put up in cases containing fifty each, in a form quite convenient for carrying in the pocket. It must be apparent that their object is to facilitate the labours of the physician. The appended note, directing the original copy of the prescription to be left with the apothecary, will prevent the demand for it which often occurs. The cost of getting up such blanks is very small, and it is to be desired that their use will become general. With such a basis, perhaps some of our medical brethren will be induced to give more attention to the chirographic art. Should this happy effect result from the use of these forms, our friend Parrish will deserve a laurel.

Among the new suggestions, we find that a *solution of Gutta Percha in Chloroform* is recommended as a plastic in surgical dressings. An advantage is its ready application, like the solution of gun cotton in ether, the chloroform quickly evaporating, a thin stratum of the *gutta percha* being left over the surface, or in the interstices of the tissue which is saturated with the solution. It is particularly applicable in abrasions of the skin, where it is merely desirable to protect the surface from the action of the air and moisture. The preparation is made with *one dram* of the gutta percha in small pieces, to *one fluid ounce* of chloroform: the solution is effected in a few hours.

We have on several occasions been asked for a recipe for Solution of Citrate of Magnesia which shall be practical, and yield a good

article. Several formulæ have been published, but perhaps none better than the following of M. Rabourdin, of Paris, viz.:

R. Carbonate of magnesia,	- - -	292 grains.
Citric acid (crystals,)	- - -	446 "
Water,	- - -	10 fluid ounces.
Lemon syrup,	- - -	2 " "

Dissolve 138 grains of the carbonate in two fluid ounces of water, holding in solution 170 grains of citric acid, and pour it into a twelve ounce mineral water bottle. The remaining 154 grains is then triturated with the remainder of the water, and also poured in the bottle. 185 grains of citric acid is now added, and the bottle immediately and strongly corked and tied over. The citric acid reacts with a portion of the carbonate and forms citrate of magnesia, whilst the other part is converted into bicarbonate of magnesia by the liberated and compressed carbonic acid. As soon as, with occasional agitation, the opaque fluid becomes but slightly milky, the cork is carefully removed, the solution filtered, and reintroduced into the bottle, along with two fluid ounces of lemon syrup, and 91 grains of citric acid; when the cork is securely replaced and wired.

These quantities produce twelve fluid ounces of the solution, each ounce containing about a dram of the citrate. The first solution may readily be made in larger quantity at once, and after filtering, be divided in the bottles, and the syrup and last portion of acid added to each before corking. If the carbonate of magnesia and citric acid are free from impurities, there is really no use in filtering after the second addition of acid, as the solution becomes clear a few hours after the last portion of acid has been added. We have tried this formula several times, and believe it worthy of adoption. The bottles should be strong, especially for the first addition of citric acid, and the cork should not be removed previous to filtration, till the carbonate has nearly all been dissolved.

The dose is from a half to a whole bottle.

As several inquiries have been made relative to a formula for "Fluid Extract of Vanilla," the following is offered as affording a good article, viz.:

Take of Vanilla,	- - -	3j.
Sugar,	- - -	3ij.
Simple syrup,	- - -	Oss.
Water,	- - -	Oss.
Deodorized alcohol,	-	f.3j.

Cut the vanilla in thin transverse slices, triturate it with the sugar till

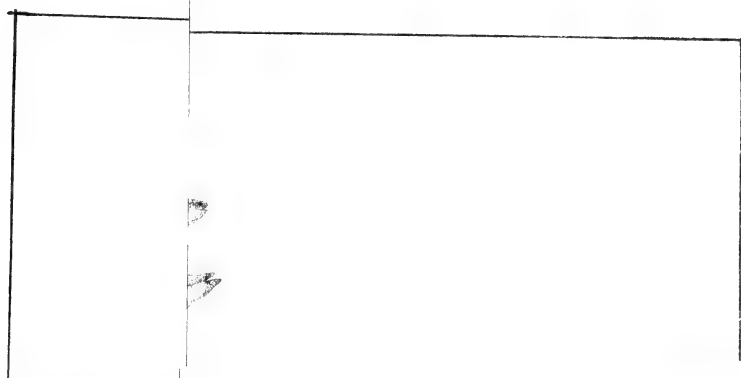
reduced to powder, moderately fine, then add the syrup with two ounces of the water; put the mixture in a strong pint bottle, cork, and tie it over, and place it in a vessel of water, which is then heated to the boiling point and kept there for half an hour. The cork is then removed, and the liquid strained. The residue of the vanilla is then replaced in the bottle with the remainder of the water mixed with the alcohol, the cork put in, and the bottle again heated in hot water for half an hour, when the contents are strained and mixed with the first liquid.

The liquid thus obtained keeps very well, and is strongly impregnated with the odorous and sapid principles of vanilla, for which a saccharine solution is a good solvent.

We have received from Messrs. Lea & Blanchard the first volume of Dr. F. Knapp's "CHEMICAL TECHNOLOGY; OR CHEMISTRY APPLIED TO THE ARTS AND TO MANUFACTURES," of which Prof. Walter R. Johnson of this city is American editor. We will notice the work in our next number.

ERRATUM.

In the article at page 184, on the "Decomposing power of hot steam," the patentee's name should read "TILGHMAN," instead of "*Tighlman*."





R. F. SMITH. 141 CHESTNUT ST. PHILA.

QUASSIA AMARA.



THE
AMERICAN JOURNAL OF PHARMACY.

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OCTOBER, 1848.  
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ART. LIV.—ON QUASSIA AMARA, *Linnaeus*.

By J. CARSON, M. D., &c.

(*With a Plate.*)

THE *Quassia amara* belongs to the family SIMARUBEÆ, *Richard*. SIMARUBACEÆ, *Lindley*.

The *Essential Characters* of this family are:—*Flowers* hermaphrodite, or by abortion unisexual. *Calyx* four or five-parted, persistent, imbricate in aestivation. *Petals* equal in number to, or alternate with, but longer than the divisions of the calyx; aestivation twisted, deciduous. *Stamens* equal in number, or twice as many as the petals, inserted on a hypogynous disk, free. *Ovary*, with the lobes as numerous as the petals; *style* one, filiform, enlarged at base. *Carpels* as many as the petals, articulated on the axis, capsule bivalved, dehiscing inwardly, monospermous. *Seeds* ex-albuminous, pendulous; *cotyledons* two, thick; *radicle* short, superior. Trees or shrubs, leaves alternate, pinnate without stipules. (*De Candolle.*)

It is a small family, and a remarkable analogy exists between all the members of it. A principle, bitter and tonic, has been detected in them, upon which their medical properties depend; this is the same in all, and has, from the

generic name *Quassia*, been called *Quassin*. A milky juice is said to exude from the bark. They are tropical plants, and are found in the eastern and western hemispheres.

QUASSIA AMARA belongs to Decandria, Monogynia, *Lin*.

GENERAL CHAR. *Flowers* hermaphrodite. *Calyx* short, persistent, prominent, with five deep divisions. *Petals* five, much longer, arranged in a tubular form, twisted in aestivation. *Stamens* long, exserted, provided at base with a hairy scale. *Ovaries* five, placed on a broad receptacle. *Styles* five-partite below, but united into a long exserted one with a five-furrowed *stigma*. *Fruit* drupaceous.

SPECIFIC CHAR.—A small *tree*, from six to ten feet high, straight, irregularly branched, with an ash coloured, smooth bark. The *leaves* are sparse, occupying generally the summit of the branches, very smooth, pinnate; *leaflets* sessile, in pairs, usually two with an odd one, entire, elliptical, acute, reticulated, a little revolute on the margin, of a deep green, with a reddening of the veins above, and lighter beneath; *petiole* winged, with the joints cuneate. *Racemes* long, simple, terminal. *Flowers* large, scarlet, with short pedicels and a recurved bract at base. The *fruit* is black and ovoid.

This plant is a native of Surinam, Guiana, and other parts of South America. It is cultivated in the West Indies. A specimen in our possession came from the garden of Dr. Stevens, of St. Cruz.

The merit of having first directed the attention of the scientific world to the virtues of the plant, by some authorities has been awarded to Mr. Rolander, by others to Mr. Dahlberg. It appears that a negro by the name of *Quassi*, at the time of Mr. Rolander's (a Swedish naturalist) sojourn in Surinam, was in the habit of treating the fevers of the country with the root. This was procured by him, and taken to Europe about the year 1756. He supposed that

it was derived from the *Zygophyllum aestivans*, a plant belonging to *RUTACEAE*. Through Mr. Dahlberg, however, whose popularity was great as a counsellor and military officer, the secret became known. The tree affording the remedy was pointed out to him, and after cultivating it in his garden, he transmitted specimens of the organs of fructification preserved in spirit to Linnæus, who determined its true position under the name *Quassia amara*. The first full specific account, with a drawing, was published under the auspices of Linnæus, by Dr. Blom, in an inaugural essay, in the "*Amoenitates Academiæ*," for 1763, vol. 6.

By Pereira* we are informed that "Fremin mentions that, about the year 1714, the flowers of this shrub were highly valued at Surinam, on account of their stomachic properties." "In 1730 the root is said to have been found in the collection of Seba, a celebrated spice dealer of Amsterdam." Haller, in the *Biblioth. Botan.* ii. 558, refers to it as having been well known in 1742.† That *Quassia* was known as a remedy, long before the tree was described, is evident from the statement of Dr. Blom,‡ that Linnæus was in the habit of lecturing on the virtues of the wood. But whether this knowledge dates farther back than the return of Mr. Rolander, the period of its introduction specified by Sprengel,§ is a point not easily settled. If the flowers were used in Surinam, Rolander would not have supposed the plant to be a *Zygophyllum*, nor would Linnæus have given sanction to such a mistake, by publishing it as such in his *Sp. Pl.* 2d ed., a mistake corrected when the flowers &c., were given to him by Mr. Dahlberg. The English authorities did not adopt the article for some time. In Lewis' Dispensatory for 1768, no mention is made of it, and none is to be found in the Lectures of Dr. Cullen, published in 1773. In his *Materia Medica*, Cullen mentions it as a bitter tonic,

* Mat. Med. † Merat. and De Lens. ‡ *Amoenitates Academ.*
§ *Hist. de la Médecine.*

and refers to Murray's Apparatus Medicaminum for an account of the drug.

The wood, in fact all parts of the tree, are possessed of intense bitterness, this is owing to the principle *Quassin*. Although this plant does not afford the article now used, a more fruitful source having been discovered in the Jamaica tree, it is of high interest as having produced the originally introduced article.

ART. LV.—ON KALMIA LATIFOLIA.

BY CHARLES BULLOCK.

(*Extracted from an Inaugural Thesis.**)

WITH a view of ascertaining the proximate chemical constituents of the *Kalmia*, and more especially that to which its action on the animal economy is due, the leaves were subjected to the following experiments :

Dr. Stabler, of Alexandria, was of opinion that the activity of the plant is due to a volatile oil ; an opinion not altogether reconcilable with the fact that he found the decoction more active than the substance, when taken into the stomach.

1st. Both the infusion and decoction gave copious precipitates with sub-acetate of lead, lime water, and proto-nitrate of mercury ; the latter, after the solution had been deprived of its tannin by means of gelatin.

2d. The addition of per-chloride of iron to the decoction,

* For the Botanical and Medical history of this plant, the reader is referred to an article by Dr. Stabler, in the 16th vol. page 241, of this Journal, on which account we have omitted the first portion of this thesis.—Eds.

caused a deep brown colour; solution of gelatin, a cloudiness without precipitate.

3d. Tinct. of iodine did not detect the presence of starch.

4th. A cold infusion was made by macerating the leaves in water for two weeks. After filtering, it was clear and colourless. A portion was heated to 212° , but no coagulation took place.

To another portion, a solution of corrosive sublimate was added; it immediately became cloudy, and soon a light coloured precipitate took place, which was much accelerated by a gentle heat. This precipitate was soluble in a solution of carbonate of potassa, but was again precipitated upon the addition of sulphuric acid in excess.

5th. The addition of a solution of nitrate of silver to the infusion caused a black precipitate; solution of proto-chloride of tin, a dirty white precipitate.

6th. One ounce of green leaves was digested in 4 oz. of absolute alcohol for two days. The tincture, when filtered, was of a deep green colour. On the addition of water it became cloudy, and upon standing deposited a green resin which was insipid, melted by the application of heat, and burned with a smoky flame.

7th. Two ounces of the leaves were digested in half a pint of sulphuric ether for two days. The ethereal tincture had a bright green colour, and the sweet nauseous taste of the leaves.

On decanting it, a stratum of a light red colour and syrupy consistence separated, which was removed from the supernatant ether. Its taste was very astringent, and it afforded a copious yellow precipitate with gelatin, and a greenish black one with per-chloride of iron. The colour of the precipitate, with the salts of iron, indicated that the tannin differed from that which exists in oak bark which affords bluish black precipitates with the same salts.

The ether, after the separation of the tannin, was allowed to evaporate spontaneously : an extract was obtained which was re-dissolved in alcohol to separate the resin, and chlorophylle ; no fixed oil could be separated, although the extract left by the ether had a greasy feel, and had the appearance of a small portion of oil existing in it.

8th. The leaves were treated in the manner directed by the U. S. P., for obtaining veratria : the product was a reddish brown extract, having a slightly bitter, sweet, and astringent taste, but did not possess any properties that would lead to the supposition of its possessing the peculiar virtues of the plant.

9th. The method for obtaining quinia, lobelina, sanguinarina, and various alkaloids, and proximate principles were tried, but without any satisfactory results.

10th. Two ounces of the leaves were treated with half a pint of sulphuric ether, the tannin separated, and the ether allowed to evaporate. The extract was treated with warm alcohol, which dissolved the resin and chlorophylle and left a white flaky mass, which, when thrown upon a filter, washed with cold alcohol, and dried, was found to be insipid, and was insoluble in water and cold alcohol, partially soluble in boiling alcohol, and readily soluble in ether. It was inflammable and burned with a white smoky flame, proving by its properties to be wax.

11th. Four ounces of the dry leaves in powder were distilled in a glass retort with sufficient water to cover them. The distilled water was returned upon an additional four ounces of the leaves and again distilled ; the water possessed the odour of the leaves, but was perfectly clear. It was then saturated with chloride of sodium and allowed to stand for several days, but not the slightest lactescence was observable.

12th. Two pounds of the fresh leaves were introduced

into a metallic still, with a sufficient quantity of water; a gradual heat was then applied until half a gallon had distilled over. This was returned upon another portion of leaves, and again submitted to distillation, and the process continued until several pounds of the leaves were consumed. The distilled water was clear and transparent, and did not evince, in the slightest degree, the presence of a volatile oil, even after standing several weeks.

13th. A decoction of the green leaves was treated with sub-acetate of lead to precipitate the gum tannin, and colouring matter, and after filtering to separate them, saturated with hydro-sulphuric acid to precipitate an excess of lead: the clear liquid was then boiled to expel the sulphuretted hydrogen, and slowly evaporated. A reddish brown translucent extract was obtained, having a hot and acrid taste. A portion of this extract was dissolved in alcohol, boiled with animal charcoal, filtered, and allowed to evaporate, but without any thing farther being obtained.

Another portion was dissolved in water, the acetic acid present saturated with magnesia, sulphuric ether added, and after repeated agitation allowed to separate; it was then decanted and spontaneously evaporated; the product was a very small portion of straw coloured matter, which possessed the acidity of the extract and which seemed to be the acrid matter of the plant. It was but sparingly soluble in ether, for on re-evaporating the dissolved extract it was found to be still very acrid. In sensible properties, this substance resembled the acrid matter which exists in the *Arum triphyllum*; it was not dissipated by boiling, although much injured, or even destroyed by long continued high temperature. Several attempts were made to obtain it in an isolated condition, but without success, and consequently no satisfactory proof relative to its medicinal activity could be arrived at, but from its properties it was presumed that if taken into the system in sufficient quantity, it might, from

its acrid nature, produce the peculiar effects, attributed to the plant.

A third portion of the extract was treated with boiling alcohol of the sp. gr. .800 and the alcohol decanted and thrown upon a filter; on cooling, a white gelatinous matter was deposited in the filter, owing to its insolubility in alcohol a little below its boiling temperature. When dry this matter presented a greyish white amorphous mass, slightly sweet to the taste; it was freely soluble in water but insoluble in cold absolute alcohol and ether, answering in its properties to mannite.

The remainder of the extract from which the last mentioned substance was obtained, was insoluble in ether and alcohol, but soluble in water. It was of a brown colour, insipid, and afforded a copious precipitate with nitrate of silver, which are the properties of what is termed extractive matter.

14th. Four hundred grains of the dried leaves were incinerated in an open crucible, the remaining ashes weighed fourteen grains; these were digested in two ounces of water and pure nitric acid added until effervescence ceased; it was then filtered: with a portion of this, oxalate of ammonia gave a copious white precipitate. Ferro-cyanide of potassium caused a blue colour, and on standing deposited a precipitate of prussiate of iron. To another portion, a solution of chloride of platina was added; after standing some time a yellow precipitate of chloride of platinum and potassium was formed. Another portion, containing carbazotic acid deposited fine yellow crystalline needles, which deflagrated by application of heat.

From these experiments the constituents of the leaves of the *Kalmia Latifolia* are inferred to be—Gum, Tannin, Resin, Chlorophylle, Fatty Matter, a substance resembling Mannite, an Acrid Matter, Wax, Extractive Matter, Vegetable Albumen, Yellow Colouring Matter, Lignin, and Salts of Lime, Iron and Potash.

ART. LVI.—A CONCISE HISTORICAL SKETCH OF THE PROGRESS OF PHARMACY IN GREAT BRITAIN. INTENDED AS AN INTRODUCTION TO THE PHARMACEUTICAL JOURNAL. BY JACOB BELL, London, 1843. John Churchill: pp. 108.

THE early history of our art in Great Britain, must have a direct interest for the American pharmacist, as in many respects we are a scion of the English stock, changed in many of its features by growth in a distant soil, and much modified by influences from continental Europe, which, until recently, the exclusiveness of the English have excluded from their borders to a great extent. But a few years have elapsed since pharmacy here was in the hands of the physician's assistant, at his own office, and the apothecary, as now existing, was a character almost unknown in our country. These few years have witnessed a marvellous change in the relations of these two branches of the medical profession not less rapid than advantageously progressive, and it will not be the least interesting feature of this notice of Mr. Bell's work, that it will afford us the means of contrasting the history of our development with that of our British fathers.

Mr. Bell observes: "At the period at which our history commences, pharmacy was in the hands of the physicians, who professed the healing art in all its branches, and prepared their medicines themselves, or superintended the preparation of them. The science of medicine was so little understood and so imperfectly cultivated, that it was in general practised empirically, and was often confounded with sorcery and witchcraft. The Greek word *Φάρμακω* signifies either to practise witchcraft or to use medicine, and this acceptance of the term was acted upon in our country as late as the 16th century. There were, therefore, persons

of various classes, both men and women, who professed to cure disease, some by incantation, others who considered that by their genius they were 'cut out and configured for it,' and others, again, who had obtained a kind of traditional education from recognized physicians, and who, therefore, constituted the medical profession."

At that time no laws existed for the protection of the public, on the one hand, nor the physician on the other. The first act of Parliament, bearing on the profession, was passed in the year 1511, and is entitled, "**AN ACT FOR THE APPOINTING OF PHYSICIANS AND SURGEONS.**" 3d Henry VIII. c. 9.

It commences thus: "For as much as the science and cunning of Physick and Surgery (to the perfect knowledge of which be requisite both great learning and ripe experience,) is daily within this realm exercised by a great multitude of ignorant persons, of whom the greater part have no manner of insight in the same, nor in any other kind of learning; some also can read no letters on the book, so far forth that common artificers, as smiths, weavers, and women, boldly and accustomably take upon them great cures and things of great difficulty, in the which they partially use sorcery and witchcraft, partly apply such medicines unto the disease as be very noxious, and nothing meet, therefore, to the high displeasure of God, great infamy to the faculty, and the grievous hurt, damage, and destruction of many of the King's liege people, most especially of them that cannot discern the uncunning from the cunning. Be it therefore, (to the surety and comfort of all manner of people,) by the authority of this present Parliament enacted, That no person within the city of London, nor within seven miles of the same, take upon him to exercise and occupy, as a physician or surgeon, except he be first examined, approved, and admitted by the Bishop of London, or by the Dean of St. Paul's, for the time being, calling to him or them

four Doctors of Physic, or for Surgery, other expert persons in that faculty ; and for the first examination such as they shall think convenient, and afterward alway four of them that have been so approved." * * *

The same discretionary power was delegated by the bill to the Bishops of other dioceses away from London.

This act invested the faculty of medicine in a body of persons who practiced medicine, surgery, and pharmacy. The physician's assistants were called apothecaries, who gradually assumed practice on their own account, and gave rise, ultimately, to the extensive body now known in England as apothecaries or general practitioners.

A College of Physicians was established in 1518, at the suggestion of Thomas Linacre, the physician of Henry VIII. Its powers were increased in 1540, the physicians were excused from attendance on juries and parochial offices, and were empowered to enter the apothecaries shops of London, "to search, view, and see the apothecary's wares, drugs and stuffs," and to destroy such as they found corrupt or unfit for use. At the same period the barbers and surgeons had their rights invested in one company, with the proviso that the surgeons should not practise shaving, nor the barbers any surgical operations except drawing teeth.

There having been an abuse of privileges on the part of the surgeons, an other Act was passed two years after, which, after enumerating the chief points of the previous law, says: "Sithence the making of which said act, the Company and Fellowship of Surgeons of London, minding onely their owne lucre, and nothing the profit or ease of the diseased or patient, have sued, troubled and vexed divers honest persons, as well men as women, whom God hath endued with the knowledge of the nature, kind, and operation of certain herbs, roots and waters, and the using and ministering of them to such as have been pained with customable diseases, as women's breasts being sore, a pin

and the web in the eye, uncomes of the hands, scaldings, &c., and such other like diseases. * * * And yet the said persons have not taken any thing for their pains or cunning. * * In consideration whereof, and for the ease, comfort, and succour, help, relief, and health of the King's poor subjects, inhabitants of this, his realm, now pained or diseased, or that hereafter shall be pained or diseased, Be it ordained, &c., that at all time from henceforth, it shall be lawfull to every person being the king's subject, having knowledge and experience of the nature of herbs, roots, and waters, &c., to use and minister, * * according to their cunning, experience and knowledge, * * the aforesaid statute * * or any other act notwithstanding."

This act has reference to the practice of medicine without remuneration, and was taken advantage of by empirics to evade the law, notwithstanding which, however, numerous prosecutions occurred, during the reigns of Queens Mary and Elizabeth.

"In 1553, the College of Physicians obtained a new act, [1 Mary c. 9.] in which their former powers were confirmed and enlarged, and in which it is stated that 'the four censors or any three of them, shall have authority to examine, survey, govern, correct and punish all and singular physicians and practisers in the faculty of physick, apothecaries, druggists, distillers, and sellers of waters and oils, and preparers of chemical medicines'—according as the nature of his or their offences may seem to require."

The powers thus granted were not a dead letter, as many years after, Dr. Alexander Leighton was reprimanded and lost his ears, for malpractice.

Somewhere in the latter part of the 16th century, the London physicians gradually repudiated pharmacy, and it naturally fell into the hands of their assistants, and an inferior class of their own body. In 1606, these apothecaries were incorporated into a company, in conjunction with the gro-

cers, who also sold drugs, but in 1617, they obtained a separate charter, and it was made unlawful for surgeons to sell medicine, or grocers to keep apothecary's shops. They were also empowered to search shops and examine drugs. Soon after uniting their interests in a corporate capacity, they established [1623] a dispensary for making some of the more important preparations, which was placed under the superintendence of a committee.

The first British Pharmacopœia was published by the London College of Physicians, in the year 1618, and was the first attempt at reducing the confused and incongruous mass of recipes and materials to a regular standard, and it succeeded but imperfectly. Its subsequent editions were issued in 1621, 1632, 1639, 1650, 1677, 1721, 1746, 1788, 1809, 1824, and 1836. Notwithstanding the several revisions of this work from 1621 to 1650, inclusive, Culpeper, in a translation of the edition of 1650, thus speaks of some of the items of the list of materia medica. The words in parentheses are his remarks: "*The fat, grease, or suet of a duck, goose, eel, bore, heron, thymallos, (if you know where to get it,) dog, capon, beaver, wild cat, storck, hedge hog, hen, man, lyon, hare, kite or jack, (if they have any fat I am persuaded it is worth twelve pence a grain,) wolf, mouse of the mountains, (if you can catch them,) pardal, hog, serpent, badger, bear, fox, vultur, (if you can catch them) album, græcum, east and west benzoar, stone taken from a man's bladder, viper's flesh, the brains of hares and sparrows, the rennet of a lamb, kid, hare, and a calf, and a horse, too, (quoth the colledg.] [They should have put the rennet of an ass to make medicine for their addle brains.] The excrement of a goose, of a dog, of a goat, of pigeons, of a stone horse, of swallows, of men, of women, of mice, of peacocks, &c."*

Culpeper, although styling himself "*Nich. Culpeper, Gent., Student in Physick and Astrology,*" and possessed of many superstitious notions, derived from the ancients or

his own cogitations, undoubtedly was useful in his day in advancing the cause of correct practice. His tendency was to the vegetable materia medica, and some of his observations relative to the gathering and curing of plants, and some processes of our art, are worthy of remembrance.

The difficulties and jealousies incident to pursuits so closely allied as medicine and pharmacy, were visible in the youth of their separation, as is evident from the remains of the literature of that period. In a pamphlet published in 1671, entitled, "*The Wisdom of the Nation is Foolishness*," the following remarks are found :

"Dr. *Merret*, a collegiate physician of London, and a practiser of thirty years with apothecaries, gives this account of them in his book lately put forth (page 8.) They use medicines quite contrary to the prescriptions,—myrtle leaves for senna, &c. * * They falsify the grand compositions of the London Dispensatory. * * (Page 9.) Tis very common for them to load medicines with honey and other cheaper ingredients, and to leave out in whole or in part those of greater value. * * Such *CHYMISTS* which sell preparations honestly made, complain that few apothecaries will go to the price of them. * * All the drugs imported into England, sooner or later, are sold or made into medicines, although they have lain by years with the *Merchant*, *Druggist* and *Apothecary* before they are used."

About this period the number of mineral remedies was sufficient to engage a separate class of men in their fabrication. Many of these doubtless were alchemists, and it is a well established fact that many chemical discoveries of value were brought to light during the persevering and enthusiastic pursuit of the *Elixir of Life* and the *Philosopher's Stone*, by those genii of the laboratory, as the following process of Raymond Lulle, quoted by Mr. Bell from Dumas, will exhibit :

"To make the *elixir of sages* or the *philosopher's stone*, (and by this word *stone* the alchemists did not mean literally

a stone, but a certain compound having the power of multiplying gold, and to which they almost always attributed a red colour,) to make the *elixir of the sages*, take the *mercury of philosophers*, (lead,) calcine it until it is transformed into a *green lion* (massicot;) after it has undergone this change, calcine it again until it becomes a *red lion* (minium.) Digest in a sand bath this *red lion* with *acid spirit of grapes*, (vinegar.) Evaporate this product, and the mercury will be converted into a kind of *gum* (acetate of lead) which may be cut with a knife; put this gummy matter into a luted cucurbit and distil it with heat. You will obtain an insipid phlegm, then spirit, and red drops. Cymmerian shades will cover the cucurbit with their sombre veil, and you will find in the interior a true dragon, for he eats his tail (i. e. the distilled liquor dissolves the residuum.) Take this black dragon, break him on a stone, and touch him with red charcoal; he will burn, and assuming a glorious yellow colour, he will re-produce the *green lion*. Make him swallow his tail, and distil this product again. Lastly, rectify carefully, and you will see appear *burning water* and *human blood*, (a reddish-brown oil obtained in the process which has the property of precipitating gold from its solutions.)”

The Apothecaries' Society, founded as before stated in 1617, continued to flourish, and in 1671 they established a chemical laboratory in conjunction with the dispensary. In 1682 they became a trading body, and supplied the navy. In 1694 apothecaries were exempted from serving as constable, scavenger, and other parochial duties, and from juries. By this time their number had increased from 114, at the origin of the act of incorporation, to 1000. “They had become an influential body; and by practising medicine as well as pharmacy, they excited the jealousy of the physicians, who suffered materially from this encroachment, and endeavoured to reduce their rivals to their original condition of grocers and venders of drugs. The contest rose to

a great height ; on one side it was alleged that the improvement that had taken place among the apothecaries was a great benefit to the public, and that the physicians, by endeavouring to restrain them, "were undoing what the labour of their predecessors had accomplished. While the other party animadverted on the extortionate charges of the apothecaries, and the loss which the public sustained by being deprived of the advantage of the best advice in many cases for which it was impossible to pay both the physician and the apothecary."

It appears that the evil complained of induced a number of physicians to establish dispensaries, at which medicines were supplied on reasonable terms by assistants, who dispensed them under their directions. An instrument of writing to this effect was published by the President, Censors, &c., of the College of Physicians, subscribed to by fifty-three of their number, in which each subscriber obligated himself to put ten pound sterling in a common fund, to be devoted to the support of dispensaries, where medicines could be had by the poor at low rates, and to which the physicians interested could send their prescriptions. Three of these establishments were put into operation in February, 1697, and soon grew sufficiently formidable to call forth the opposition of the apothecaries, to whom they gave great offence. Mr. Bell quotes the following effusion of one Garth, in his "Dispensary."

"Our manufactures now the Doctors sell,
And their intrinsic value meanly tell ;
Nay, they discover, too, (their spite is such,)
That health, than crowns more valued, costs not much ;
Whilst we must shape our conduct by these rules,
To cheat as tradesmen or to starve as fools."

The contest between the rival interests continued to rage, pamphlets were written, filled with crimination and abuse, each party endeavouring to prove the motives of the other to be bad. As a natural consequence, the physicians, whose aim

in establishing the dispensaries appears to have had special reference to the poor, were led to advise their wealthy patients to patronize them for the following reasons, viz:

“*First.* Because physicians prescribing for them were assured that the medicines were undoubtedly the best.

“*Secondly.* Because many excellent remedies are there deposited, which have never yet been trusted in an apothecaries’ shop.

“*Thirdly.* Because the physician was not obliged to prostitute his honour and conscience, by overloading his patient to oblige a craving apothecary, or run the risk of being undermined in his reputation by slanderous suggestions, by not submitting to the apothecaries’ under-pick-pocket.

“*Lastly.* Because he could serve his patient, quantity for quantity and quality for quality, fifteen shillings in the pound cheaper than anywhere else: which is a thrift the greatest man that does not love to be cheated, need not be ashamed of.”

To justify these declarations, instances of extortion were brought forward, one of which seems so incredible that we quote it.

“Apothecary’s bill for attending Mr. Dalby, of Ludgate Hill, five days, total amount £17 2s. 10d.” of which the following items had reference to *one* day.

<i>August 12th.</i>	<i>s. d.</i>		<i>s. d.</i>
An emulsion, - -	4 6	Another draught, - -	2 4
A mucilage, - - -	3 4	A glass of cordial spirits, -	3 6
Jelly of Hartshorn, - -	4 0	Blistering plaster to the arms,	5 0
Plaster to dress blister, -	1 0	The same to the wrists -	5 0
An emollient glister, -	2 6	Two boluses again, -	5 0
An ivory pipe armed, -	1 0	Two draughts again, -	4 8
A cordial bolus, - -	2 6	Another emulsion, - -	4 6
The same again, - -	2 6	Another pearl julep, -	4 6
A cordial draught, - -	2 4		
The same again, - -	2 4		
Another bolus, - -	2 6		
			£3 3 0

Dr. Pitt, six years after the establishment of the dispensaries, in his pamphlet entitled "*The Craft and Fraud of Physic Exposed*," states, that the three dispensaries made up about twenty thousand prescriptions annually, and that the doses one with the other might average a penny a piece.

The next year, 1704, an apothecary published a small book called "*TENTAMEN MEDICINALE, or an enquiry into the differences between DISPENSARIANS and APOTHECARIES, wherein the latter are proved capable of a skilful COMPOSITION OF MEDICINES, and a rational practice of Physick, to which are added some PROPOSALS to prevent their future increase*," in which he takes up the charges of Dr. Pitt, endeavours to disprove some of his assertions, and remarks that "when a physician has got a guinea for his visit, it seldom much concerns his honour or conscience how the apothecary gets a shilling for his medicines."

This war of words, which long continued, only tended to widen the breach between the physicians and apothecaries, and is particularly interesting to pharmacutists, as the origin of their rise and progress as a distinct class of the medical body in England. The dispensaries prospered and increased, the assistants at first instructed by physicians in the crude pharmacy of the period, necessarily improved their art by confining their attention exclusively to it. The physicians having accomplished, in great measure, their object, were not disposed to assume the trouble and oversight of the dispensaries longer than was necessary, and the individuals who had charge of them, on the contrary, were strongly disposed to assume the independent condition of masters. These persons were therefore the original "Chemists and Druggists" of England, the progenitors of that very extensive body now represented by the Pharmaceutical Society.

In 1723 further difficulties occurred between the physicians and apothecaries, some of the former having behaved in a very arbitrary manner, in reference to one Goodwin, (as it afterwards appears without sufficient cause,) entered his shop during his absence, condemned certain of his drugs, and burnt them in the street before his door. This act was again committed by them, and although the utmost endeavours of Goodwin could not repeal the law, yet he obtained £600 damages.

These inquisitorial visits were occasionally marked with some laughable anecdotes. On one of these occasions an apothecary placed by accident or design on his counter a jar labelled "*Ung: Album*," which contained græcum album, (white dog's dung.) The medical gentlemen seized on the jar, each giving his opinion of the quality of the *simple ointment*; one said it was too hard, another that it did not smell enough of the camphor, a third averred that it should be malaxated with oil, whilst the last got in a passion and was for throwing it out at once, at which the shop boy, who had been amused with their remarks, objected, said it was a good medicine, and told them what it was.

The Pharmacopœia of 1721 rejected many useless items of the materia medica, but it was not until 1746 that that work became a rational formulary. The number of compound syrups and ointments was greatly reduced, as was the very complex electuaries, plasters, &c. Yet the formulæ for *Mithridate* with forty and *Theriac* with sixty ingredients were retained.

In 1748 the Apothecaries Company obtained chartered powers to license apothecaries to sell medicines in London, or within seven miles, and gave them the authority to visit shops and examine drugs within their limits. This acquisition of power caused difficulties amongst the apothecaries and produced another pamphlet war. On one occasion, an

apothecary who had suffered imposition from the visitors, had his store entered by them during his absence. Having called for his jar of Mithridate, they pronounced it unfit for use, and demanded the usual fine, when just at that moment the apothecary returned, and on learning their opinion of his Mithridate, he said :

“Nay, now I am convinced what a nest of villains I have to deal with, who being nettled at my refusing their usual imposition, begin to show their knavish principles by condemning medicines of their own compounding.”

He then verified his assertion, by producing the invoice and witness who brought the Mithridate from the Apothecaries Hall.

Soon after the grant of power last mentioned, the Apothecaries Company petitioned parliament for power to search the shops of *Chemists* also, but this power was not granted. This attempt caused much altercation between the chemists and apothecaries, with a mutual development of improper professional conduct. We will give another of Mr. Bell's quotations, as illustrative of the *quality* of the charges, taken from “*The Apothecary Displayed.*” In reference to the statements that druggists mix impure drugs in their compounds, it says :

“It is almost impossible for men to be more diligent and careful, or to take more pains than they do ; how often may you see them with a *seron of bark*, first sifting away the dust, then separating the small sort, dividing the large and woody from the more delicate and curious quill ; while they are thus cleansing, sorting, and dividing their drugs, one or other of the most eminent Apothecaries alights from his chariot at the door, and buys up all the raspings of the rhubarb, the siftings of the bark, and the sweepings of the shop. Does he buy it to burn, think you, or conscientiously destroy it for the good of mankind ? (as they would make you believe in their petition.) No, he says he wants it for

powder, or it will do well enough for the tincture or syrup, or if perchance he purchases four ounces of the better sort only to keep in a glass and show his customers, has he not four pound of the worst sort with it? * * *

If the Druggist beats in the dross with the drug, where has he the dross to beat in by itself? You know the Apothecary bought that, and could *he* be supposed to beat in the dross by itself, what the DEVIL becomes of the drug?"

The first Edinburgh Pharmacopœia was published in 1699, and new editions have appeared in 1722, 1736, 1744, 1756, 1774, 1783, 1792, 1803, 1804, 1806, 1813, 1817, 1839, 1841.

The next epoch in our history has reference to the general meeting of the Apothecaries in 1794, held at the *Crown and Anchor Tavern*, London, to devise means to put a stop to the encroachments of the Chemists and Druggists. The following extract from their Report will show the rapid increase in numbers and power of that class of men, who we have seen originate as assistants in the Dispensaries of 1696.

"That this unjust and innovating usurpation of the Druggists, together with the intrusion of uneducated and unskilful persons into professional practice, called loudly for some speedy and effective act, which should at once destroy the obtrusions complained of, and restore credit and respectability to the profession."

"If we regard personal views, it was stated to be a fact, the proof of which was in the tables of calculation then present, that were the aggregate sums obtained by this infringement of the Druggists, and divided amongst the Druggists of this metropolis, (a body of men unknown to the world till about the end of the last century, unauthorized by any public charter, and almost undefined by any public act,) were these sums equally divided, as they ought to be divided, amongst the Apothecaries of the metropolis, every

one would have an addition of nearly £200 a year to his present income. But this evil it appeared was not confined to the capital; it was declared to be a morbid infection, that it began at the capital as a central point, but diffused its deadly breath from thence to all the cities and towns throughout the kingdom. Nor stopped the contagion here. From the larger cities and towns it was beheld propagating itself to the smaller cities and towns, till at length, so general was the disease, there was scarcely to be found a village or hamlet without a village or hamlet druggist. If the sale of medicines and giving of advice was not here sufficient to support the vender, he added to his own occupation, the sale of mops, brooms, bacon, butter, and a thousand such articles besides."

A committee of twenty was appointed, funds subscribed, a general correspondence entered into with various parts of the country, and a vast mass of facts collected bearing on the condition of the druggists; a petition to Parliament followed, but nothing issued from that authority bearing on the druggists and chemists. In fact the effects were beneficial, as it induced a community of interest and prepared the way for a strongly manifested opposition to subsequent attempts by the apothecaries and physicians.

In 1813, the Association of Apothecaries caused a bill to be introduced into Parliament, containing several clauses extremely objectionable to chemists and druggists. A general meeting of the latter was held on March 4th, 1813, to consider the best means of opposition. A committee was appointed of some of the most talented of their number, of which the late William Allen was chairman, which acted in the most energetic manner. Funds were collected, the members in other cities corresponded with, petitions presented, &c., which was so effective in its results, as to cause the withdrawal of the offensive clauses, and thus gained the object of their appointment. The excess of funds thus sub-

scribed were placed in the hands of trustees, and continued to accumulate until the formation of the present Pharmaceutical Society, into whose treasury it was transferred with the consent of the surviving subscribers—by William Allen the only trustee then living.

We have now followed our author pretty closely in his "Historical Sketch," until it arrives at the present order of things in England. We have seen the apothecaries exfoliate from the physicians, become a separate class and rise into an influential body. Subsequently the chemists and druggists owed their origin to the same medical body, through the dispensaries, and have now outgrown in influence the apothecaries, in opposition to whom they originally arose. To continue the subject by describing the events immediately anterior to the formation of the Pharmaceutical Society, together with the interesting circumstances that contributed to its birth and growth, seems naturally to follow, but the already extended limits of this notice admonishes us to conclude it, which we now do with the promise of a continuation of the subject at a future time.

W. P., JR.

LXVII.—CHEMICAL TECHNOLOGY, OR CHEMISTRY APPLIED TO THE ARTS AND MANUFACTURES. By Dr. F. KNAPP, Professor at the University of Giessen. Translated and Edited, with numerous notes and additions, by Dr. EDMOND RONALDS, Lecturer on Chemistry at the Middlesex Hospital, and Dr. THOMAS RICHARDSON, of New Castle-on-Tyne. First American Edition, with notes and additions by Prof. WALTER R. JOHNSON, of Philadelphia. Vol. 1. Illuminated, with 214 engravings on wood. Philadelphia: Lea & Blanchard, 1848. pp. 504.

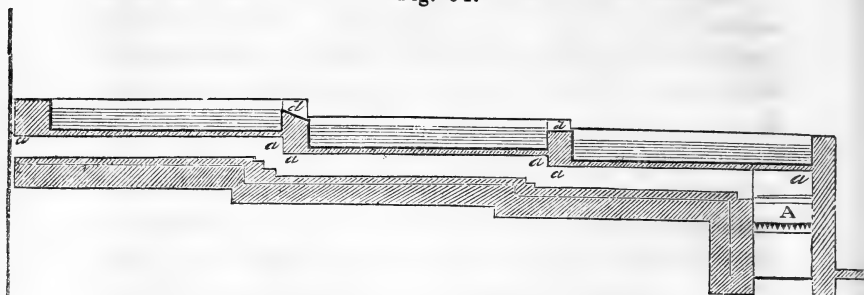
THE application of correct scientific principles to the processes of manufacturing is one of the noblest functions of the student of abstract science, because his labours have a direct bearing in improving the facilities of life in large communities. By the deductions of such a mind, a hitherto worthless product, or even noxious residue, is turned into a valuable agent in the economy of society, and the mass are doubly benefitted. For a long period, the *modus operandi* of most kinds of manufacture was kept secret, or at least no works were generally accessible which would enable the uninitiated to enter into their pursuit. No journals for the promotion of the mechanic and scientific arts were known (as now conducted) for a long period, and the mysteries of the manufactory were preserved with the most jealous watchfulness, both on the part of principals and subordinates. Whilst this disposition continued, slow progress was made in the steps towards perfection.

Things have changed now, and manufacturers depend more on patents and the influence of large capital, well knowing that the cheaper an article of general consumption can be fabricated, the larger will be the demand. It is with pleasure, therefore, that we announce the republication here of the experience of Europe, especially when under the superintendence of capable men.

The work before us differs, in several respects, from other works on the subject in its arrangement. The author has placed his subjects in groups, two of which constitute the present volume. First, branches of manufacture depending upon the process of combustion, including, 1st, heat, fuel, the applications of heat, direct and indirect, in the construction of furnaces, draft chimneys, steam heat, &c; 2d, of illumination and lighting materials, including the manufacture of gas, the construction of lamps and the fuel that serves them. The first embraces the important processes for charcoal and coke; the second, the mode of extracting various fatty substances, used in illumination, as stearine, stearic acid, wax, the fixed oils, &c., &c. The chapters on gas manufacture are particularly well illustrated with cuts, exhibiting the various steps of the process. The old adage of "a penny saved is two pence gained," applies in large manufactures, as in the daily routine of domestic life, and whilst we repudiate niggardliness equally in either case, we rejoice at the application of a wise economy in both.

The second group, consisting of processes concerned in the production and application of the alkalies and earths, is much more extensive than would be at first imagined, as it embraces a number of collateral and resulting branches, and is that part most interesting to the pharmacist. The important bearing that sulphuric acid has in so many processes, has caused it to be treated of in this connection in the extraction of sulphur from its natural sources; the production of sulphuric acid, with the *modus operandi* of the lead chambers; the concentration of the acid, &c. We append a specimen of the illustrations exhibiting the expensive platinum arrangement for concentrating the acid from sp. gr. 1.7 to 1.84, together with the refrigerating syphon.

Fig. 94.



“The concentrating apparatus in which this separation [of water] is effected, consists of leaden pans and a platinum retort. The former, fig. 94, are erected over a fire, A, and supported by iron plates, *a a*, against which the flame beats; *d d* are incisions, through which the lower pans are filled. The evaporation precipitates a little sulphate of lead and oxide of iron, (anhydrous,) whilst the boiling point of the fluid attains a height at 65 per cent. of hydrate which endangers the pans, from the great heat, and causes a useless loss of acid by evaporation. When, therefore, about 11 per cent. of water has been evaporated, with which nitric oxide, nitric and sulphurous acids pass off, the acid is conveyed (having a specific gravity of 1.7) through the syphon *x* into the platinum retort, fig. 95, the fire under which is closely approximated to the fire of the pans A. The syphon *x*, which is here represented as closed, is worked without a stop-cock by the vessel *c*, on filling the retort in a remarkably simple and ingenious manner. When this vessel is lowered with its spout to the gutter *d*, the outer limb of the syphon, which is constantly full, becomes lengthened below *n*, and acid consequently flows out.

“The danger and great loss by breakage attending the use of glass vessels, have induced the manufacturers very generally — notwithstanding the great cost — to make use of platinum retorts. These are made (nearly all in Paris) to contain from five to twenty cwts., and cost from 8,000 to

Fig. 95.



12,000 dollars; all the joints in the retorts are soldered with gold. During the boiling, the contents of the retort separate into commercial acid and some acid water, which is conducted by the tube in the capital, and its spiral leaden continuation to one of the pans, where it is used to concentrate a quantity of weak acid from the chamber. If the heat were further increased, the boiling point would suddenly rise to 326° C. (619° F.,) and hydrated sulphuric acid would distil over, which, of course, is not desirable.

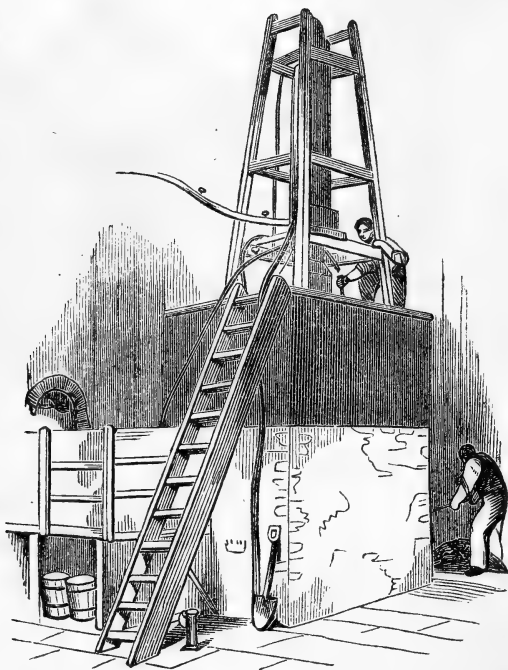
“With reference to the quantity of lead taken up by sulphuric acid in different states of concentration, experiments have lately been instituted by Anthon, which prove how very objectionable the practice must be of concentrating the acid in leaden pans beyond the prescribed limits. Anthon found in acid thus concentrated, and afterwards cooled

down to 65° F., the following quantities of sulphate of lead :

“ Acid sp. gr. 1.724 contained		$\frac{1}{480}$ ths	of sulphate of lead.	
“	“ 1.791	“	$\frac{1}{80}$ th	“
“	“ 1.805	“	$\frac{7}{320}$ ths	“

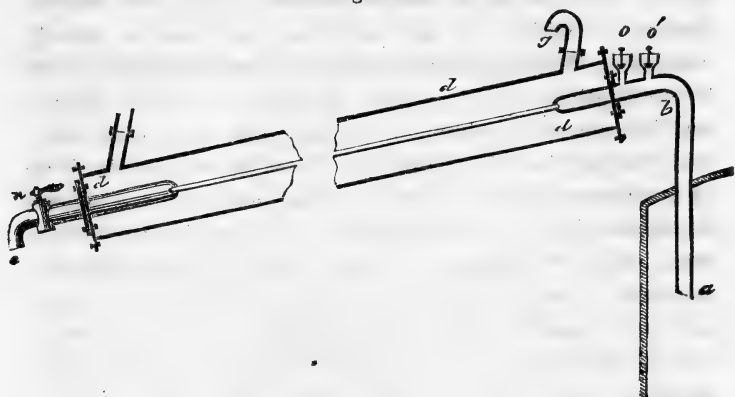
The annexed wood cut (fig. 96) shows the manner in which the platinum still is erected in the concentrating house of the vitriol works.

Fig. 96.



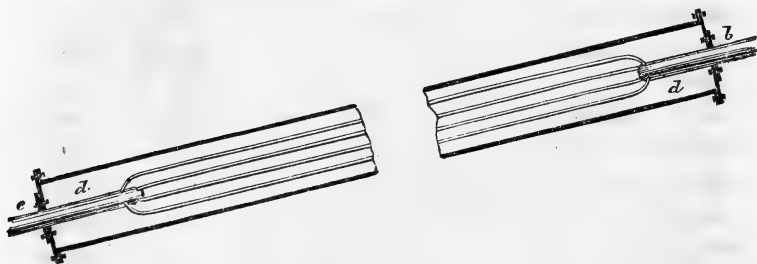
“ The high price of platinum vessels renders it very much to the interest of the manufacturer that they should be in constant use ; yet it is impossible to draw off so powerful an acid at that temperature into the glass carboys in which it is sent out, and leaden coolers cannot be used. Hence arises the necessity of the platinum syphons, figs. 97 and 98,

Fig. 97.



which at the same time answer the purpose of coolers. The syphon *a b c* is let into a wide tube *d d*, which is supplied with a current of cold water [below] through *e*. The water after becoming warm, flows off at *g*. The cooling is therefore effected by surrounding the hot acid in *b c* with a current of cold water passing in an opposite direction, the effect of which is very much increased by making the longer limb in four distinct tubes, as in fig. 98. To fill the syphon

Fig. 98.



the cock *n* is stopped, and acid is poured first into *o*, and then into *o'* till it runs down into the retort through *b a*. When *o* and *o'* are now closed, and *n* opened, the syphon comes into play."

The extraction of common salt is next treated of, imme-

diately followed by a detailed account of the soda manufacture, in which salt and sulphuric acid are so largely employed. This important process is so luminously explained by descriptions and cuts, that the general reader, though but little versed in chemical matters, can get a clear idea; and the fact that the English revisers have brought it up to the present state of the art in that country, will ensure its authority to the manufacturer. It remains to be seen what effect Mr. Tilghman's Patent will exert on the process at present in use. The dependence of one branch of manufacture on another is beautifully illustrated in the connection of the production of sulphuric acid, carbonate of soda, muriatic acid, chloride of lime and bi-carb. soda; indeed, it is only by the consumption of the residues that these articles can be manufactured at such low rates. The production of potashes from all the commercial sources is fully dilated on, and their relative value to the manufacturer exposed. Boracic acid and borax next occurs, followed by the fullest history of the saltpetre production that we have met with in a work of this kind. The natural sources of this substance, from caves, as in our own country, and earthy deposits in the East, are exposed; and the several modes of conducting its artificial fabrication in what are termed the saltpetre plantations of Europe, which, though artificial, so far as the bringing together the materials is concerned, is probably the identical natural process that ever occurs when nitrogenous and alkaline and earthy matters mixed in a moist state, are exposed to the atmosphere for a long time, and which is known by the term nitrification. The chemical changes which result in the generation of nitric acid, appear to be, first, the conversion of nitrogen into ammonia, and the subsequent oxidation of this into nitric acid and water, by a sort of fermentative, (catalytic) action, which, though much has been done by

Kuhlman and others for a century past, is yet more or less obscure. In fact, the nitrogen of the air appears to be involved in the process, as more product is obtained than can fairly be attributed to the solid material employed. The experiments of Kuhlman, Dumas and others have produced nitric acid by the direct oxidation of ammonia; but the great problem of this manufacture is yet to be solved. The elements of nitric acid exist around us as atmospheric air, in any abundance: who will tell us how to combine them by a rapid and economical process in the relation NO^5 ? Recent discoveries have given the world this source for cyanogen, why may we not hope for the other? Its solution is a glorious object of ambition, fraught with immense advantages to mankind, and reward to the discoverer.

Connected with saltpetre, is the gunpowder and nitric acid manufacture, especially the former, which is extensively treated of. The second group concludes with the soap manufacture, which is one of those dependent on the alkalis, and of prime importance. The sources of fatty matter in the vegetable world are exposed, especially the palm oil; and the bleaching of oils preparatory to using them is described. The theory, and the practical points of soap making, in all its varieties, are fully noticed.

The appendix, of upwards of fifty pages, is devoted to lamp black, matches, cokeing, patent fuel, ventillation, lamps, candles, gas illumination.

In reference to the additions of the American editor, they have relation chiefly to the subjects of fuel and illumination, and from the known ability of the editor, in reference to these subjects, his opinions are doubtless possessed of much value. The mechanical execution of the work, especially the illustrations, is highly creditable to the American artist, and speaks favourably for the enterprize of the publishers.

W. P., JR.

ART. LVIII.—A DISPENSATORY OR COMMENTARY ON THE PHARMACOPŒIAS OF GREAT BRITAIN AND THE UNITED STATES, COMPRISING THE NATURAL HISTORY, DESCRIPTION, CHEMISTRY, PHARMACY, ACTIONS, USES, AND DOSES OF THE ARTICLES OF THE MATERIA MEDICA. By ROBERT CHRISTISON, M. D., V. P. R. S. E., &c. Second edition, revised and improved : with a Supplement containing the most important new Remedies, with copious additions, and two hundred and thirteen illustrations. By R. EGLESFELD GRIFFITH, M. D., &c. 1 vol. 8vo. pp. 1008. Philadelphia : Lea & Blanchard, 1848.

THIS American reprint of the extensive work of the eminent Scotch pharmacologist, like its two congeners, treats copiously of the remedial agents embraced by the *Materia Medica*, and with the London and United States, constitutes the trio in the English language, designated as Dispensatories—now in full career of popularity. All three are professedly exponents of the several Pharmacopœias appertaining to the kingdom of Great Britain. The United States Dispensatory, however, has given prominence to our own authority, and made the others secondary, while in the original publications of London and Edinburgh, our standard is either altogether neglected, or but transiently referred to. The present edition of the work under consideration has the deficiency supplied by the labours of the editor.

We have always considered it extraordinary that, while three Pharmacopœias existed in Great Britain, and two of them possessed a peculiar advocate and exponent in the form of a Dispensatory, the remaining one, the Dublin, had not a corresponding accompaniment. Irish medical talent is certainly equal to the undertaking. In government, we are aware that English, Scotch and Irish policy, and

schemes of national advantage are widely different. This may be comprehended by reference to circumstances of a local character, and hereditary prejudices, and we are not disposed to discuss whether or no a moral difference exists, sufficient to give rise to modifications of law and equity: but that the disparity in physical traits is so decided as to call for a difference in the preparation of purgatives, diuretics, &c., appears to us an indubitable fallacy. One method of dosing might suffice for all, and the experiment ought at least to be tried, by framing a national British Pharmacopœia.

Christison's Dispensatory was first issued in 1842, and may be regarded as the successor to the New Edinburgh Dispensatory of Dr. Duncan—a work which began its career in the first year of the present century, and terminated with the eleventh edition, in 1826. This latter work also formed the basis of the American Dispensatory by Dr. Coxe, which commenced in 1806, and ended with the eighth edition, in 1840. The second edition of Dr. Christison's work, which is the one now published, has been enriched by such information as discovery in science has afforded within the past six years. It has been posted up to the present time, and thus again offered to the profession: in this country, with the additions of the American editor.

The first portion, termed the Introduction, is devoted to the processes of pharmacy. The principles of pharmacy are here succinctly laid down, and each form of exhibiting medicines clearly made known and discussed. Where chemical apparatus is required for the formation of particular preparations, a drawing of the utensil employed is frequently given. In this chapter, weights and measures are duly set forth and explained, and to it have been added by the editor, Dr. Griffith, a chapter on specific gravity, with ample tables of the density of various fluids and prepara-

tions; an exposition of thermometrical equivalents, with full tables exhibiting relations on the different scales, the effects of temperature, symbols, solubility of salts, and an explanation of terms used in prescriptions, from Gray's Supplement to the Pharmacopœias.

The Materia Medica proper commences in the usual way, the alphabetical arrangement being followed, which seems, time honoured, to be inseparable from a dispensatory. The information imparted under each head, is that found in the more recent treatises on the Materia Medica. Where articles are derived from the vegetable kingdom, the plants affording them are referred to their appropriate natural history, position, under classes and orders, but few botanical details are indulged in. Medical botany is of secondary consideration, and the author is no doubt impelled to this by the full instruction which Scotch students receive in that department, and the co-existence of the admirable treatise on the subject by Dr. Lindley. The account of drugs met with in the English market is clear and concise, and their chemical constitution correctly given, in accordance with the most recent analyses.

There are certain subjects to which Dr. Christison appears to have given especial attention; the chapters upon these are peculiarly rich with information. Conium is one of them, which by him has been experimented on. The test for the activity of this drug, which originated with the Edinburgh College, is invaluable, we mean that by liquor potassæ. Another of these is scammony. Dr. Christison's investigations into the purity of this drug, have presented the subject in its true light, and shown that the grossest impositions have been practised. Sophisticated scammony is most common in the English market, and by the author has been divided into three kinds, which are termed *calcareous*, *amylaceous*, and *calc-amylaceous*. The worst of the specimens contained by analysis 42.4 per centum of resin.

Bad as these may be, they must be decidedly active when compared with the stuff designated as scammony, and sold as of *first quality* in the United States. One lot, which was extensively distributed, and which during the past year fell under our observation, contained but 6 per cent. of resin; the basis of it was gum tragacanth. The moral sense of the drug community must either be greatly depraved, or else extreme ignorance prevails in it, to tolerate such imposition. The recent act of Congress with regard to adulterated and spurious articles, will, we hope, aid and facilitate the exposure of all such imposition.

For the chemical examination of articles employed in medicine, we are indebted to European, and more especially to continental experimenters. The rich reward of fame is justly due the chemists who have zealously and indefatigably laboured in this field of research; a few laurels, however, might be awarded those who in this country have manifested a similar spirit, and really have contributed their quota to the progress of analysis. We are prompted to this reflection from the examination of the article on *Lobelia*, in which not one word is mentioned of the researches of Mr. Procter, although he, at least ten years back, satisfactorily isolated the principle upon which the activity of the drug depends, and by a continued series of experiments since, has studied its character and properties. His papers are published in the *American Journal of Pharmacy*. We might excuse Dr. Christison for such omission, but in the reprint justice should have prompted, as well as policy suggested, the completion of the chemical history.

Upon turning over the pages some slight errors are observable, as for instance, in attributing the Tahiti arrowroot to *Tacca pinnatifida*. Mr. Nuttall, several years ago, described the plant affording Sandwich Island arrowroot, and gave to it the name of *T. oceanica*, because so widely dif-

fering from the Asiatic species as to constitute a different one.

The Dispensatory issued on this side the Atlantic, differs from the original Edinburgh edition in the addition of numerous illustrations, which, with the specification of the processes of the United States Pharmacopœia, its nomenclature, and an account of indigenous products, constitute the labours of the editor. The book, then, is replete with valuable information; it is one of the standards of the day; and as such, must meet with the favour it deserves.

J. C.

ART. LIX.—LAW IN REFERENCE TO ADULTERATED
DRUGS.

An Act to prevent the importation of adulterated and spurious Drugs and Medicines, approved 26th June, 1848.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That from and after the passage of this act, all drugs, medicines, medicinal preparations, including medicinal essential oils, and chemical preparations used wholly or in part as medicine, imported into the United States from abroad, shall, before passing the Custom House, be examined and appraised, as well in reference to their quality, purity, and fitness for medical purposes, as to their value and identity specified in the invoice.

SEC. 2 *And be it further enacted,* That all medicinal preparations, whether chemical or otherwise, usually im-

ported with the name of the manufacturer, shall have the true name of the manufacturer, and the place where they are prepared permanently and legibly affixed to each parcel by stamp, label or otherwise; and all medicinal preparations imported without such names affixed as aforesaid, shall be adjudged to be forfeited.

SEC. 3. *And be it further enacted*, That if on examination any drugs, medicines, medicinal preparations, whether chemical or otherwise, including medicinal essential oils, are found in the opinion of the examiner to be so far adulterated or in any manner deteriorated, as to render them inferior in strength and purity to the standard established by the United States, Edinburgh, London, French and German pharmacopœias and dispensatories, and thereby improper, unsafe, or dangerous to be used for medicinal purposes, a return to that effect shall be made upon the invoice, and the articles so noted shall not pass the Custom House, unless on a re-examination of a strictly analytical character, called for by the owners or consignees, the return of the examiner shall be found erroneous, and it shall be declared as the result of such analysis, that the said articles may properly, safely, and without danger, be used for medicinal purposes.

SEC. 4. *And be it further enacted*, That the owner or consignee, shall at all times, when dissatisfied with the examiner's return, have the privilege of calling, at his own expense, for a re-examination, and on depositing with the Collector such sum as the latter may deem sufficient to defray such expense, it shall be the duty of that officer to procure some competent analytical chemist possessing the confidence of the medical profession, as well as of the colleges of medicine and pharmacy, if any such institutions exist in the State in which the Collection District is situated, [who shall make] a careful analysis of the articles included in said return, and a report upon the same under oath, and

in case the report, which shall be final, shall declare the return of the examiner to be erroneous, and the said articles to be of the requisite strength and purity, according to the standards referred to in the next preceding sections of this act, the entire invoice shall be passed without reservation on payment of the customary duties ; but in case the examiner's return shall be sustained by the analysis and report, the said articles shall remain in charge of the Collector, and the owner or consignee, on payment of the charges of storage, and other expenses necessarily incurred by the United States, and on giving a bond with sureties satisfactory to the Collector to land said articles out of the limits of the United States, shall have the privilege of re-exporting them at any time within the period of six months after the report of the analysis ; but if the said articles shall not be sent out of the United States, within the time specified, it shall be the duty of the Collector, at the expiration of the said time, to cause the same to be destroyed, holding the owner or consignee responsible to the United States for the payment of all charges, in the same manner as if said articles had been re-exported.

SEC. 5. *And be it further enacted*, That, in order to carry into effect the provisions of this act, the Secretary of the Treasury is hereby authorized and required to appoint suitably qualified persons as special examiners of drugs, medicines, chemicals, &c., namely : one examiner in each of the ports of New York, Boston, Philadelphia, Baltimore, Charleston and New Orleans, with the following salaries, viz : at New York sixteen hundred dollars per annum, and at each of the other ports above named one thousand dollars per annum, which said salaries shall be paid each year quarterly, out of any moneys in the Treasury not otherwise appropriated ; and it shall be the duty of the said Secretary to give such instructions to the Collectors of the Customs in the other Collection Districts, as he may deem

necessary to prevent the importation of adulterated and spurious drugs and medicines.

SEC. 6. *And be it further enacted*, That the special examiners to be appointed under this act, shall, before entering on the discharge of their duties, take and subscribe the oath or affirmation required by the ninth section of the act of the thirtieth of July, eighteen hundred and forty-six, entitled "An Act reducing the duty on imports and for other purposes."

SEC. 7. *And be it further enacted*, That the special examiners authorized to be appointed by the fifth section of this act, shall, if suitably qualified persons can be found, be taken from the officers now employed in the respective Collection Districts, and if new appointments shall be necessary, for want of such persons, then, as soon as it can be done consistently with the efficiency of the service, the officers in said districts shall be reduced so that the present number of said officers shall not be permanently increased by reason of such new appointments.

DEPARTMENT OF STATE, June 28, 1848.

The above is a true copy as compared with the original Roll. (Signed) W. S. DERRICK, A. C. C.

Circular instructions to collectors and other officers of the Customs.

TREASURY DEPARTMENT, July 8, 1848.

The attention of Collectors and other officers of the Customs is specially called to the provisions of the annexed act of Congress, entitled, "An Act to prevent the importation of adulterated and spurious drugs and medicines," approved 26th June, 1848.

Upon entry of any "medicinal preparations, whether chemical or otherwise, *usually* imported with the name of the manufacturer, and the place where prepared, perma-

nently and legibly affixed to each parcel," careful inspection and examination must be made by the United States appraisers to see that the true name of the manufacturer, and also the place where said articles were prepared, are 'legibly affixed to each parcel by stamp, label, or otherwise," as required by the *second* section of the act. In default of these requisites the Collector will immediately report the case with all the facts to the United States District Attorney in order that he may institute the necessary legal proceedings to obtain a decree of condemnation and forfeiture of the articles in pursuance of the act. When a decree of condemnation and forfeiture, for the causes before stated, takes place, an immediate examination of the articles in the manner indicated in the *third* section of the act, must be had to ascertain whether all or any of the articles contained in the importation possess the standard of strength and purity therein required. If any articles do not agree with these standards, they cannot be sold, like other forfeited goods, as it would defeat the object of the law thus to throw upon the community adulterated and spurious drugs and medicines. Such portion of the importation as may prove to possess the proper standard of strength and purity may be immediately sold and the proceeds accounted for as in ordinary cases of forfeiture. But the adulterated and spurious articles contained in the importation must be destroyed in the manner hereinafter mentioned.

It will be observed on reference to the third section of the act that all imported "drugs, medicines and medicinal preparations," &c., are to be tested in reference to strength and purity by the standards established by the "United States, Edinburgh, London, French, and German pharmacopœias and dispensaries." It is not conceived to be the intention of the law that the articles referred to should conform in strength and purity to each and all of those standards, as such conformity is believed to be impracticable wing to the variations in those standards. If, therefore,

the articles in question be manufactured, produced or prepared in England, Scotland, France or Germany, as the case may be, and prove to conform in strength and purity to the pharmacopœia and dispensatory of the country of their origin, said articles become exempt from the penalties of the law. All articles of the kind mentioned, produced, manufactured or prepared in any other country than those before mentioned, must conform in the qualities stated to the United States pharmacopœia and dispensatory.

In case of appeal from the report of the special Examiner as provided for in the fourth section of the act, the Collector will exercise proper judgment and discretion in the selection of an analytical chemist possessing the qualifications and standing required by the act, to make the prescribed analysis, previously taking from the owner or consignee a sufficient deposit of money to defray the expenses of the analysis, and when completed, returning to the owner or consignee any excess of money thus deposited.

Upon application to export any adulterated and spurious articles in pursuance of the fourth section, proper bond and security must be taken for the exportation and production of proof of landing abroad, as in the case of exportation of goods for benefit of drawback, or from public warehouse.

It will be perceived that the fifth section provides for the appointment at certain designated principal ports of special Examiners of "drugs, medicines, chemicals, &c.," and makes it the duty of the Secretary of the Treasury "to give such instructions to the Collectors of the Customs in the other collection districts as he may deem necessary to prevent the importation of adulterated and spurious drugs and medicines."

When, therefore, importations of drugs, medicines, chemicals, &c., take place at any port of entry other than those enumerated in the fifth section of the act, the Collector of the Port will appoint, in pursuance of the 16th sec-

tion of the act of 1st March, 1823, to be compensated at a per diem rate of five dollars when employed, some respectable person deemed by the Collector to possess suitable knowledge and qualifications to make examination and report on the value and quality of the articles according to the standards prescribed by the act. In case of dissatisfaction, and appeal taken by the owner or consignee from said Examiner's report, the same course in respect to analysis and the expenses and proceedings connected therewith as required at the principal ports, will be pursued. In case a suitably qualified person to act as special Examiner cannot be found at the port or convenient thereto; or when analysis is called for, a properly qualified analytical chemist cannot be conveniently obtained at said port, the Collector will immediately so advise the Department in order that a special Examiner or analytical chemist, according to the circumstances, may be detailed from one of the principal ports to make the examination or analysis at the port of arrival.

The reports of the special Examiners, as also the analysis of the analytical chemists, must be made in writing and signed by them respectively and filed in the Custom House. Whenever any articles are to be destroyed, as required by the fourth section of the act, they must be conveyed to some suitable place, and proper means, to be prescribed by the special Examiner or Analyst, be used for their safe and effectual destruction, and executed in the presence of an officer of the Customs detailed by the Collector for the purpose. Before destruction of the articles a particular description or statement of the same must be prepared, containing the name of the importer or owner, the date of importation, the name of the vessel and the place from whence imported, with the character and quantity of the articles and the invoice value. The fact of their having been destroyed must be certified on said statement by the officer detailed for the purpose. These statements must be file

in the Custom House and returns prepared therefrom must be rendered quarterly to the Department.

Before the special Examiners appointed under this act can enter on the discharge of their duties, the following oath or affirmation, to be administered by the Collector, must be taken and subscribed by them, viz:

I, A. B., having been appointed by the Secretary of the Treasury special Examiner of Drugs, Medicines, Chemicals, &c., within and for the port and district of ———, do solemnly, sincerely, and truly swear (or affirm) that I will diligently and faithfully perform the duties of said office as prescribed by the act to prevent the importation of adulterated and spurious drugs and medicines, approved 26th June, 1848, and will use my best endeavors to prevent and detect frauds upon the revenue of the United States. I further swear (or affirm) that I will support the Constitution of the United States.

Signed, A. B.

Sworn (or affirmed) before me this ——— day of ———,
A. D., 184 . C. D., Collector.

These oaths or affirmations must be forwarded for file in the department.

R. J. WALKER,
Secretary of the Treasury.

Adulteration of Medicines.

At a special meeting of the College of Pharmacy of the City of New York, held on Thursday evening, July 6th 1848, the following Preamble and Resolutions were unanimously adopted :

Whereas : upon the application of the College of Pharmacy of the City of New York to the Congress of the United States at its present session, seconded with one accord by the Medical and Pharmaceutical Institutions throughout

the country, by the late National Medical Convention, by Physicians and Apothecaries, and sound-hearted men of all parties, with almost unprecedented unanimity, a law has been enacted and signed by the President on the 26th June, 1848, entitled, "An act to prevent the importation of adulterated and spurious drugs and medicines;" which, in our belief, is calculated to arrest the criminal traffic in spurious and adulterated drugs and chemical preparations intended for medical use, so far, at least, as relates to their importation from abroad, (which, to the honor of our own country, we believe has hitherto been the chief source of this detestable species of fraud;) and whereas, it becomes our duty from time to time, as occasion presents, to adopt such measures as we may find expedient to carry out one of the prominent objects of our Institution, viz. "to guard against abuses in the preparation and sale of Medicines," therefore

Resolved, That we will, collectively and individually, give our earnest aid to make this salutary law effective in all its parts.

Resolved, That in our judgment, cheating in Medicine is a great moral—and ought to be legal—felony, compared with which, the counterfeiting of bank notes and coin are venial offences.

Resolved, That we will collectively and individually take all proper measures to expose publicly, and discountenance in every manner, all persons in this country who may be detected in the base crime of adulterating and sophisticating articles and preparations intended to be sold as medicines, and that we will report them particularly to all Colleges of Pharmacy and Medical Institutions with which we correspond.

Resolved, That should any of our own members be guilty of such acts, we recommend the prompt application of the seventh section of the third article of the By-Laws of the College, which is as follows:

“Complaints may be preferred against any member of the College, to the Board of Trustees, for misconduct in his business, either by the adulteration of articles or otherwise. If the Trustees are satisfied that such complaints are well founded, they shall appoint a sub-committee to remonstrate with the individual, and if he shall refuse or neglect to remedy the evil complained of, the Trustees, may report the case to a meeting of the College, to be called by the President at their request, giving the offending member due notice thereof, and at such meeting he may be expelled, by a vote of three fourths of the members present.”

Resolved, That copies of the foregoing preamble and resolutions be presented to each of the Colleges of Pharmacy and of medicine in the United States, that they be published in the newspapers at the discretion of the President and Secretary, and that copies of them be offered for publication to the journals of Pharmacy and Medicine in this country, and to “The Pharmaceutical Times and Journal of Chemistry,” and “The Pharmaceutical Journal and Transactions” in London, and the “Journal de Pharmacie” in Paris.

By order of the College:

WILLIAM H. MILNOR, *Secretary*.

ART. LX.—ON THE EMPLOYMENT OF THE TARTRATE OF POTASSA AND MAGNESIA, AND THE ACETATE OF MAGNESIA AS PURGATIVES.

THE *Journal de Pharmacie* for April, 1848, contains a long report on the above subject, by MM. Guerard and Garot, on two communications sent to the Society of Pharmacy, at Paris, by M. Maillier and M. Renault.

The former proposes the salt obtained by saturating cream of tartar in solution with ordinary carbonate of magnesia, under the name of Tartrate of Potassa and Magnesia, in the form of a solution like that of the citrate. 30 parts of cream of tartar, $8\frac{1}{2}$ parts of carbonate of magnesia, and 700 parts of boiling water, are heated together till a solution is formed, which is aromatized and sweetened.

The reporters observe that they repeated the formula according to the conditions indicated, and obtained a limpid liquid, having a decidedly saline taste, which is like that of the neutral tartrate of potassa, and it is only owing to the large amount of water of dilution that it is diminished in disagreeableness compared with other vegetable salts.

They find that the borotartrate of potassa, (the soluble cream of tartar of the French,) when similarly treated, yields a much more tasteless solution, and propose the following formula :

Soluble cream of tartar, of the Codex	.	.	1.00
Carbonate of magnesia	.	.	.24
Water	.	.	6.00

The soluble cream of tartar is dissolved in the water in a silver basin saturated with magnesia, and evaporated carefully till the liquid was reduced to a tenacious paste, which is divided into little masses, and dried in a stove.

It presents the form of greyish-white masses, uniform un-

crystalline fracture, is slightly elastic under the pestle, but easily reduced to powder. It is readily soluble in 8 or 10 parts of warm water, with the addition of a little lemon juice. The following formula for its administration is suggested, viz:

Borotartrate of potassa and magnesia	. 30 parts.
Citric acid	. 2 “
Aromatized syrup of lemons	. 60 “
Warm water	. 300 “

If the proportion of salt is increased, or that of the water diminished, the solution is less complete.

Mr. Renault, of Paris, who suggests the use of the acetate of magnesia, gives the following formula for its preparation, viz.: Dissolve 120 parts of carbonate of magnesia in a sufficient quantity of acetic acid and evaporate till the whole weighs 300 parts. In this state it is a syrupy liquid, which has, weight for weight, the same magnesian strength as the sulphate of that base.

M. Renault proposes that one ounce of this solution (by weight) be mixed with three ounces of syrup of oranges, to constitute the weaker, and one ounce and a half of the solution to three ounces of syrup for the stronger solution.

The great deliquescence of the salt prevents its being kept *per se*, whilst its extreme solubility in alcohol as well as water, enables it to be used in tinctures, elixirs, &c., as well as in watery solutions.

The reporters conclude by stating, that the salts in question possess decided purgative properties, though like all the salts of a similar character already employed, are not constant in their effects: that their taste is easily masked so as not to be repugnant to the sick, and that they may be advantageously introduced into therapeutics.

ART. LXI.—STILLINGIA SYLVATICA, OR QUEEN'S DELIGHT.

BY H. R. FROST, M. D., of Charleston, S. C.

ALTHOUGH it is probable, that the *materia medica* is already sufficiently ample to enable us to contend with the various diseases of life, and the improvements we should aim at, would be, rather an increase of pathological knowledge, and a more improved application of the means we already possess : yet when an article is brought before us with such strong claims to our attention, from the experiments which have been made with it, and from the effects produced, I cannot, with any propriety, refuse its admission amongst our numerous means of curing diseases. We are too much disposed to be led away by novelty, and to adopt among our curative agents, many articles which have little else to recommend them ; but of the present article, we may think more favourably, as it has been in use many years, and reports of its effects still reach our ears from legitimate and illegitimate sources.

*Description of the Plant.*Class—Monæcia Monadelphia.—*Linn.*

Natural order—Euphorbiaceæ.

Root—large, woody, perennial.

Stem—herbaceous, two to three feet high, somewhat angled by the base of the leaves, with the whole plant glabrous and lactescent.

Leaves—alternate, irregularly serrulate, somewhat coriaceous, shining on the upper face, paler underneath.

Flowers—in a terminal spike, the upper crowded as in an ament, sterile, with interposing cupulate glands.

Fertile florets, few at base.

Grows in dry sandy soils, and flowers in May and June.

The part employed is the root, which acquires a considerable size, and runs to a great depth in the earth. Its structure is not very fibrous, and it is easily broken in gathering. It grew in considerable quantities in the neighbourhood of this city, but has been nearly exterminated by the frequent searches made for it. It is found in considerable abundance in this State, particularly in Edgefield, Barnwell, Newberry, and Abbeville Districts. It is also found in Georgia and other parts of the Union.

The medicinal properties of this plant are nowhere particularly spoken of, and for a long time a knowledge of them was confined to irregular practitioners, and to others in the inferior stations of life. The reputation it had acquired in the hands of these persons, rendered it an object of attention to others more informed, and experiments which have been made, confirm, in some degree, the opinions which were entertained of its efficacy, and its title to be arranged among the active articles of the *materia medica*. Few vegetable productions, in their recent state, exhibit more power, concentrated in a small compass, or exercise an influence more energetic upon the particular organs to which it is applied, and through them to the system generally. So powerfully is this action exerted upon the capillary and secreting vessels, in changing their morbid states or conditions, and thereby disposing to a new and more healthy action, that in this respect it is nearly allied to mercury, exerting an influence little inferior, in many cases, and in others greatly to be preferred. The great object to be kept in view in the treatment of many diseases, is, to direct our remedies in such a manner as to restore healthy actions, by slowly operating upon the secretions. It is the power which mercury possesses to change the action of these vessels, which renders it so valuable an agent, and, in my opinion, the *Stillingia* is not very far its inferior. The operation of this article extends further—

it exerts an influence upon the lymphatic vessels which mercury cannot equal, and is therefore an important medicine in its diseases.

Sensible Properties.

If we open a drawer in which the recent root has been kept a short time, we are sensible of an odour, extremely strong and acrimonious, and rather of a disagreeable character.

The taste of this root is also pungent, and leaves on the root of the tongue and fauces an impression biting and irritating, exciting a flow of saliva.

The juice of the root, applied to the surface, and rubbed upon it, occasions smarting and irritation. If we remain in a close room where the root is being boiled, and the vapour passes into the room, a sense of sickness at the stomach is excited, with a disposition to discharge saliva, with headache and other unpleasant symptoms. From this circumstance, I infer that the active matter is of a volatile nature, and it is proved, by the roots losing much of their weight and activity by being long kept. It is estimated that the probable loss is 80—100 per cent.

From the above we recognize, that the plant will present a close alliance to the most active of the euphorbiaceæ. In its irritating operation upon the surface, not much inferior to the oil of the *Croton tiglium*; and in its emetic and cathartic operation, superior to the *Euphorbia ipecacuanha*, and *E. corollata*. From its alliance with these plants, its activity might be inferred, and this has been fully verified by experiment.—*Southern Journ. Med. and Pharm.* Nov. 1846.

[Dr. Frost's paper extends to the medical relations and pharmaceutical treatment of the *Stillingia*, from which we condense the following.

It possesses considerable emetic power, especially in the

recent state, and is resorted to for this purpose by country residents. A single slice of the recent root, not larger than a sixpence, chewed and swallowed, will sometimes produce vomiting, and is attended with much heat, and nausea; and with increased flow of saliva. These properties are to a great extent lost by drying.

Dr. F. infers from its strongly stimulating action on the stomach in large doses, that other parts of the system can be beneficially influenced through a *stimulant and alterative operation*, and states that it has been resorted to in diseased conditions of the capillary and lymphatic systems. For at least thirty years it has had a reputation, chiefly amongst unprofessional persons, especially in scrofulous and venereal diseases, in the form of infusion and pills.

Dr. F. considers that its reputation in scrofula is well established by competent testimony. It has been employed where the glands of the neck were enlarged, where suppuration has taken place, and in ulcerations of the same; and found beneficial. Its use is required to be continued for a length of time; and it is an object of some importance to have it in the most eligible form for administration. The plan which has been found most efficacious and agreeable, is to mix the recent juice with thick treacle, which preserves it and masks its pungency. The dose to be regulated by the effects.

It is in chronic diseases and chronic inflammations, however, that its effects are best seen, and more particularly in secondary syphilis, of which disease Dr. F. details a case treated by his friend, Dr. T. Y. Simons, with considerable success, by a simple decoction of four ounces of the recent root in a pint of water, daily for several months.

Dr. Frost prefers to employ the *Stillingia* in combination with other alteratives, as *sarsaparilla*, and *guaiacum*; and thinks its powers are increased and favourably modified.

- R.** Stillingia root, recent, ℥iv.
Sarsaparilla root, bruised, lb.ss.
Guaiacum wood, rasped, lb.ss.
Sassafras root, ℥iv.
Water, 1 gallon.

They are boiled in a covered vessel till sufficiently extracted, strained and reduced to two quarts, and sugar or treacle added to make a syrup by simmering.

This crude mode of preparation proved less advantageous than when a saturated tincture of the Stillingia was added to a syrup of the other ingredients in the rates of a pint to the gallon.

The dose of this syrup varies from ℥ss, to ℥j. three or four times a day.

Dr. Frost states that the bichloride of mercury and iodide of potassium may sometimes be associated with great advantage.

Dr. F. recommends this preparation of Stillingia in ulcerations of the palate, throat, and mucous membrane, of the nose, the skin and other parts. It will remove blotches, foul spots, and stains, &c., from the skin, and will be found useful in various cutaneous diseases.

Should this article prove of sufficient importance to attract general attention, its properties may be extracted and prepared according to a more enlightened method than that above stated; viz., by means of diluted alcohol in the present method of extracting sarsaparilla for extract or compound syrup.]

ART. LXII.—ON EMULSIONS OF CASTOR OIL.

BY A. MANNE, Pharmacien, Paris.

To M. Chevallier,

Sir,—HAVING frequently to make emulsions of Castor oil, either by prescription of physicians, or at the demand of my customers, making them in fact four or five times a day, I found myself in a position to make researches relative to the best means of administering this medicine. * * * I have employed gum arabic in different proportions, but have obtained emulsions either too thick or imperfectly made. The yolk of egg has offered me an excellent emulsion, but one yolk is required for every ounce and a half of oil. Is it not possible that the yolk of egg injures the purgative effects of the oil by its nutritive properties? does it not render the purgative heavier and less supportable by the stomach? These doubtful points lead me to doubt the utility of yolk of egg, and determined other attempts at finding a means of making a homogeneous emulsion, agreeable to the sight and more supportable by the stomach. To accomplish this I have had recourse to gum tragacanth, and the following formula has given the most satisfactory results.

Formula for Purgative Emulsion of Castor Oil.

R. Castor oil,	11 drams.
Powdered tragacanth,	$\frac{1}{2}$ dram.
White sugar,	75 grains.
Water,	$2\frac{1}{2}$ fluid ounces.
Syrup of orange flowers,	6 fluid drams.

Mix and make an emulsion as follows :

Triturate the tragacanth with the sugar, then add the syrup and agitate rapidly in a mortar until the mucilage

begins to thicken a little, I then add the oil and continue to triturate until the mixture is homogeneous, and add the water little by little during the trituration. In this manner I have obtained an emulsion of castor oil which leaves nothing to desire, and which will remain eight or ten days without an atom of oil separating.—*Jour. de Chimie Medicale.*

ART. LXIII.—ON THE EMPLOYMENT OF THE AIR BLADDERS OF FISH FOR ADMINISTERING COD'S LIVER OIL.

I HAVE employed with this object, the bladders of our river fish, such as gudgeons, *ablettes*, and perch. They replace with advantage the pharmaceutical capsules, which are difficult to prepare, expensive, and of less capacity. These vesicles being in most instances separated into two cells by a contraction or partition, they can be easily divided in this place by a cut of the scissors. The oil is introduced into the resulting opening by means of a little syringe of glass, which orifice is afterwards closed by means of a thread of silk, applied in a slip knot around the part entered by the syringe, which is then drawn tightly as soon as the syringe is withdrawn, and tied in a double knot. One-sixth, one-fifth, one-fourth, or one-third of an ounce of the oil may be thus taken at a dose, without the patient perceiving the taste or odour.

To render the employment of these new natural capsules more agreeable, they can be sprinkled with sugar.

These vesicles have a further advantage, that of being preserved in spirit of wine or gin, so as to be filled with oil as the demand requires.—DE RUDDER.—*Jour. de Chim. Medicale.*

ART. LXIV.—ON THE DISCOVERY OF A NEW ORGANIC BASE IN OPIUM.

BY DR. G. MERCK.

OPIUM appears to continue an inexhaustible source of new substances, and especially of such as possess basic properties. Up to the present time five such bodies have been prepared from opium, and satisfactorily proved to be distinct; and I have now succeeded in discovering a new base in the residues from the preparation of morphium, which I shall call *papaverine*. I shall at present merely establish the peculiarity and formula of this body, and shall on a future occasion describe more fully its preparations, its reactions, and its medicinal properties, if it possess any.

The pure base separates from alcohol in confused aggregations of white acicular crystals, and from ether in somewhat larger needles. It is very sparingly soluble in cold, more soluble in boiling alcohol, from which it again separates in a crystalline state on cooling; it is likewise very sparingly soluble in cold ether, and is deposited in crystals from a boiling ethereal solution on cooling. It is insoluble in water. The solution scarcely turns red litmus-paper blue. When the crystals are moistened with concentrated sulphuric acid, they turn blue.

Papaverine forms with acids salts, the majority of which are very sparingly soluble in water, the muriate being especially characterized by the ease with which it crystallizes. The base dissolves readily in moderately concentrated muriatic acid; and on the addition of more acid, a white precipitate first separates, which collects into drops, and forms an insoluble oily layer at the bottom of the vessel. When left quiet, crystals form in the oily and likewise in the

supernatant aqueous liquid, which continue to increase for a long time until the entire mass of the oily liquid is converted into a tissue of well-defined crystals several lines in length. A gentle heat facilitates the crystallization. The oily liquid dissolves on boiling, and again separates for the greater part on cooling. When some crystals, freed by washing with water from adherent acid, are dissolved in water, the solution remains transparent on cooling, and only after several days' standing do large crystals separate; when, on the contrary, a little muriatic acid is added to the cold solution, the salt separates in the above-described form. The crystals of the muriate are very sparingly soluble in cold water; the solution has no action upon litmus-paper. The muriate of papaverine crystallizes in right rhombic prisms.

Sulphuric and nitric acids behave towards the base like muriatic acid, only the crystals could not be obtained of such large size.

With chloride of platinum the muriate of papaverine yields a yellow precipitate, which is insoluble in boiling water and in boiling alcohol, and which I could not obtain crystallized. The analysis of the base, of the muriate, and of the platinum salt led to the following formulæ:

Papaverine . . $C^{40} H^{21} NO^8$.

Muriate . . $C^{40} H^{21} NO^8 ClH$.

Platinum salt . . $C^{40} H^{21} NO^8 ClH, PtCl^2$.

This new body is consequently distinct from the bases hitherto discovered in opium; and it is well characterized by its salts and their dissimilar oily and crystalline nature, which do not allow of its being mistaken for narcotine, to which the *pure* base has otherwise some resemblance.—

Chem. Gaz., from Liebig's Annalen.

ART. LXV.—PREPARATION OF ANHYDROUS SULPHURIC ACID.

BY MR. H. SUGDEN EVANS.

THE process we find described in most chemical works, for the preparation of anhydrous sulphuric acid, consists in submitting Nordhausen oil of vitriol to distillation at a low temperature, with a suitable apparatus for condensing the white fumes which pass over. Owing, however, to the difficulty of procuring, in this country, good Nordhausen oil of vitriol, containing any appreciable quantity of the anhydrous acid, this process has failed in the hands of many who have tried it, and the substance under notice is generally looked upon as a rare chemical product. In its crystalline state, it is so beautiful an object, that many chemists would, no doubt, be anxious to add it to their collection of chemical specimens, if they knew of an easy process by which to prepare it.

Some years ago Doebereiner and Magnus described a process for its preparation, which consisted in passing a mixture of dry sulphurous acid and oxygen gases through a tube filled with spongy platinum and heated to about 572° Fahr.; but this process requires a somewhat complicated apparatus, and would not be very easy of execution by an amateur manufacturer.

More recently a notice was published in the *Comptes Rendus*, of a process suggested by M. Ch. Barreswil, for obtaining it by means of anhydrous phosphoric acid. I have tried this process, and have found it to be neither difficult nor expensive. The process was not very minutely described in the notice of it above alluded to, and therefore as the result I have obtained has been perfectly satisfactory,

I am induced to describe the arrangement that was adopted, for the guidance of those who may wish to prepare a specimen of this interesting compound.

I first obtained some highly concentrated oil of vitriol, by heating commercial oil of vitriol in a retort until a considerable portion of weak acid had distilled off, and that which remained in the retort had acquired a density of 1.845. Some anhydrous phosphoric acid was then made by burning phosphorus beneath a receiver placed over a plate of glass, allowing free access for dry atmospheric air. The successive portions of the white flakey substance thus formed were immediately transferred to a wide-mouthed stoppered bottle, until a considerable quantity of it was collected.

On mixing these two acids ($\text{SO}_3 \text{HO}$ and PO_5) together, strong chemical action, accompanied by great elevation of temperature, occurs, to counteract which, it is necessary to make the mixture in a vessel surrounded by a freezing mixture.

The phosphoric acid was introduced into a stoppered retort, surrounded by a mixture of pounded ice and salt, and the oil of vitriol was gradually added, allowing the temperature to subside between the successive additions. When a quantity of oil of vitriol, equal to about two-thirds the weight of the phosphoric acid, had been thus added, the mixture, which acquired a dark-brown colour, was removed from the cooling bath, and a receiver was placed there, to which the retort was adapted. A gentle heat was now applied to the retort, and dense white vapours soon began to pass into the receiver where they were condensed by the cold. In this way a considerable quantity of beautiful white silky crystals was obtained. The whole process occupies but a short time, and no other precaution is necessary in conducting it, than that of avoiding too great an elevation of temperature on mixing the oil of vitriol with

the dry phosphoric acid. With careful manipulation, one ounce of phosphorus, being first converted into anhydrous phosphoric acid by combustion in dry air, and subsequently into glacial phosphoric acid by dehydrating the oil of vitriol, would yield about an ounce of the anhydrous sulphuric acid. The process, therefore, at the present low price of phosphorus, is inexpensive as well as easy of execution.

It may be well to mention, as a caution to those who are not acquainted with the properties of this body, that although, in its anhydrous and crystalline state, it has none of the characters of an acid, not even changing the colour of blue litmus, nor attacking the skin when applied to it, yet so powerful is its tendency to absorb water and pass to the state of the highly corrosive oil of vitriol, that the addition of a few drops of water to it in a bottle causes a dangerous explosion, from the great and sudden evolution of heat which takes place.—*Pharm. Journ.*

ART. LXVI.—IMPURITIES IN COMMERCIAL HYDROCHLORIC ACID.

By MR. THOMAS H. SAVORY.

THERE are two kinds of hydrochloric acid commonly kept by Chemists and Druggists, one of which is recognized as pure and fit for use in medicine, while the other is avowedly impure, and only adapted for economical and manufacturing purposes. The pure acid is colourless, while the other is always more or less coloured by reason of the impurities present. Among the impurities mentioned in Chemical and Pharmaceutical works, as most commonly occurring in this

acid, are iron, sulphuric acid, free chlorine, nitrous acid, arsenic, and lead. Sulphurous acid is also mentioned by Professor Graham as existing in this acid, but little or no notice is taken of this impurity in the works most generally referred to by Druggists.

Some impure hydrochloric acid having been used for generating carbonic acid gas in some of the operations conducted by the laboratory pupils here, the evolved gas was found to be largely contaminated with sulphurous acid. Subsequent specimens of acid obtained from several different manufacturers afforded similar results; and on submitting these specimens to a more careful examination, it appeared that sulphurous acid was not only present, but formed an important constituent, as the following analyses will show :—

No. 1.

Sp. gr. at 60° F. 1.166.

COMPOSITION.	GRAINS.
Hydrochloric Acid	29.9349
Sulphurous Acid	10.8450
Sulphuric Acid . . . .	.1538
Perchloride of Iron . . . .	.8364
Water	58.2299
	<hr/>
	100.000

No. 2.

Sp. gr. at 60° F. 1.163.

COMPOSITION.	GRAINS.
Hydrochloric Acid	31.3708
Sulphurous Acid	7.0530
Sulphuric Acid . . . .	.0738
Perchloride of Iron . . . .	.0052
Water	61.4972
	<hr/>
	100.000

No. 3.

Sp. gr. at 60° F. 1.1638.

COMPOSITION.					GRAINS.
Hydrochloric Acid	.	.	.	.	28.7278
Sulphurous Acid	.	.	.	.	8.4152
Sulphuric Acid	.	.	.	.	.1562
Perchloride of Iron	.	.	.	.	.0461
Water	.	.	.	.	62.6549
					<hr/> 100.000

The presence of sulphurous acid in such large proportions is no doubt principally due to the use of impure salt and oil of vitriol in the process of manufacture, the organic matter present being oxidized at the expense of some of the oxygen of a portion of the sulphuric acid. It may also in part arise from the employment of iron retorts, and from the application of too high a temperature, which would decompose the bisulphate of soda and liberate the volatile anhydrous sulphuric acid, together with sulphurous acid and oxygen gas. The method I adopted for estimating the sulphurous acid was to precipitate the sulphuric acid with chloride of barium, then to neutralize the remaining free acid with potash—to evaporate the solution to dryness—to fuse the resulting salt with nitrate of potash—to dissolve in water, and estimate the sulphurous acid originally present from the precipitate now afforded with chloride of barium.

It appeared desirable that the attention of Chemists and Druggists should be directed to this subject, as it is evident that the common hydrochloric acid of commerce ought not to be employed in any Pharmaceutical processes.—*Pharm. Jour.*

ART. LXVII.—ON THE VARIOUS APPLICATIONS OF GUTTA PERCHA.

By MR. WHISHAW.

At a meeting of the British Association, Mr. Whishaw read a paper giving an explanation of the various applications of gutta percha ; numerous specimens of which in the shape of thread, cord, tubular staves, driving bands, constables' staves, sticks, whips, inkstands, medallions, shields, water buckets, stereotype plates, and almost every other description of article, both useful and ornamental, were present. The paper, after stating that gutta percha was the concrete juice of a large tree of the same name, abounding in Borneo, &c., obtained by tapping the tree periodically by the Malays, stated that its introduction into this country was purely accidental ; Dr. Montgomery having transmitted the first sample of it to the Society of Arts, in 1843, at which time he (Mr. Whishaw) was secretary to that Society. The first articles of use made of gutta percha in this country were laid before the Society of Arts in 1844, and consisted of a lathe-band, a short length of pipe, and a bottle-case, which he had himself made by hand, having caused the concrete substance to become sufficiently plastic by immersing it in hot water. He also produced casts from medals, which attracted considerable attention at the time, and surgical instruments were soon after made of this new material. It was also adapted to commercial uses ; and from the period mentioned to July 11th, in the present year between 600 and 700 tons had been imported from the Gutta Percha Company. From twenty to sixty tons were now regularly imported every month. Contrary to the general opinion that gutta percha is a simple, hydrogenous substance, Mr.

Crane (chemist to the Gutta Percha Company,) found it in its ordinary state to consist of at least two distinct materials, besides a notable proportion of sulphur—viz.: 1. A white matter, gutta percha in its pure state; 2. A substance of a dark-brown colour. Various experiments were made to ascertain its strength when mixed with other matters, and also as to what pigments would mix with it without rendering it brittle or deteriorating its qualities. From these it appeared that the only pigments that could be altogether relied on to be used with gutta percha were orange lead, rose pink, red lead, vermilion, Dutch pink, yellow ochre, and orange chrome. Under the influence of heat and pressure, gutta percha would spread to a certain extent, and more so if mixed with foreign matters. All the mixtures composed of gutta percha and other substances which had been subjected to experiments, except that containing plumbago, were found to increase its power of conducting heat; but in its pure state gutta percha was an excellent non-conductor of electricity. The best composition for increasing the pliability of gutta percha was that formed in conjunction with caoutchouc tar, and next in order that of its own tar; and the best material at present known for moulding and embodying, was obtained by mixing gutta percha with its own tar and lamp black. In describing the process of manufacturing gutta percha, the author observed, that rude blocks of the material were first cut into slices, by means of a cutting machine formed of a circular iron plate of about five feet in diameter, in which there are three radial slots furnished with as many knives or blades. The blocks are placed in an inclined shoot, so as to present one end to the operation of the cutters. The slices are then placed in a wooden tank, containing hot water, in which they are left to soak until found in a plastic state. They are afterwards passed through a mincing cylinder, similar to that used in paper mills for the conversion of rags into pulp, and then thoroughly cleansed in cold water tanks; the

water, in cases of impure gutta percha, being mixed with a solution of common soda or chloride of lime. It is next put into a masticating machine, such as is used in the manufacture of caoutchouc, and then pressed through rollers; thus being connected into sheets of various widths and thickness. When necessary, the sheets are again masticated, and again passed through rollers. These sheets are subsequently cut into boards with vertical knives, placed at the further end of the table, along which the sheets are carried by a cloth or web to another roller, round which they pass, and are cut into the required widths. The bands or straps are then removed and coiled up ready for use. Driving bands for machinery are thus made, and shoe soles and heels are stamped out of similar sheets of gutta percha. In making tubes or pipes, either of gutta percha or any of its compounds, a mass of gutta percha, after being thoroughly masticated, is placed in a metal cylinder furnished with a similar piston, by which it is pressed down into an air-box, kept hot by steam, which has at its lower end a number of perforations, through which the plastic material is forced into a cup, whence it passes out, round a core, into the desired tubular form, and thence through a gauge to the required size, and into a receiver of cold water, being drawn to the other end of a long trough by a cord passing round a pulley at the far end of the trough, and returning to the person in attendance on the machine, who gradually draws the pipe away from the air machine. Thus tubes of considerable length and diameter are made to a very great extent, and are used for the conveyance of water and other liquids, and are now under test for the conveyance of gas. The paper next explained the variety of articles already made of gutta percha, which were of three classes—1. Useful. 2. Ornamental; and 3. Useful and ornamental combined. Various articles were then exhibited, including two very handsome shields, and a splendid communion dish and service. Mr. Whishaw next exhibited the Telakouphanon, or Speaking Trumpet,

and in doing so, said that speaking tubes of gutta percha were quite new, as was also the means of calling attention by them of the person at a distance, which was accomplished by the insertion of a whistle, which being blown, sounded at the other end quite shrilly. Attention having been thus obtained, you remove the whistle, and by simply whispering, the voice would be conveyed quite audibly for a distance of at least three quarters of a mile, and a conversation kept up. It must be obvious how useful these telegraphs must become in large manufactories; and indeed in private houses they might quite supercede the use of bells, as they were so very cheap, and by branch pipes could be conveyed to different rooms;—and, indeed, if there were no electric telegraphs, they might, by a person being stationed at the end of each tube of three quarters of a mile or mile, be made most speedily to convey intelligence for any distance. In private houses the whistle need not be used, but a more musical sound could be produced. He then amused the auditors by causing the end of the tube, which was of the length of 100 feet, to be inserted into the mouth-piece of a flute held in a person's hand, regulated the notes, and placing his own mouth at the other end of the tube, "God save the Queen" was played at a distance of 100 feet from the person giving the flute breath. Turning to the Bishop of St. David's he said that in the event of a clergyman having three livings, he might, by the aid of three of these tubes, preach the same sermon in three different churches at the same time. Mr. Whishaw also exhibited the gutta percha submarine rope or telegraph; which consisted of a tube perforated with a series of small tubes, for the conveyance of telegraphic wire, and which, for the purpose of preventing its being acted upon by sea water or marine insects, was banded or braided round by a small rope, and its being perfectly air-tight would render it quite impervious to the atmosphere.—*Pharm. Journ., from Athenæum.*

ART. LXVIII.—ON THE OCCURRENCE OF BERBERINE
IN THE ROOT OF THE BARBERRY AND COLUMBO.

BY DR. C. BÖDEKER.

THE root of *Cocculus palmatus*, which has long been exported under the name of Columbo root from the East Indies for therapeutical purposes, contains, as is well known, a non-nitrogenous substance, columbine, which has hitherto been little examined, and which the author had selected as a fit subject for investigation. In the preparation of this substance he found along with the colourless crystals of columbine some beautiful golden crystals, which dissolved readily in hot lime-water with a dark red colour, from which solution they separated on the addition of an excess of hydrochloric acid in light golden yellow needles, which easily dissolve in pure water. From the behaviour of this solution it was evident the crystals were the chlorine compound of an organic base. On this account the substance in question was prepared in larger quantity in the following manner:—The Columbo root was exhausted with hot alcohol of 0.889, as much of the alcohol as possible removed by distillation; and when a yellowish-brown mass of impure columbine had separated after three days' standing, the supernatant liquid, together with the aqueous solution arising from the rinsing of the impure columbine, was evaporated to dryness in the water-bath. The residue was exhausted with boiling alcohol of 0.863 spec. grav., and this solution again treated as the preceding one. The residue was then treated with boiling water, and the filtered solution mixed with a considerable quantity of muriatic acid. The precipitate thus formed was collected on a filter and well pressed between paper. Owing to its great solubility in pure water and alcohol, it could not be washed,

To remove any free adherent acid, it was dissolved in alcohol of 0.863, and precipitated from this solution by ether. The salt so obtained was an indistinctly crystalline bright yellow powder of a disagreeable bitter taste. An aqueous solution of it furnished yellow amorphous precipitates with chloride of platinum, perchloride of mercury, tannic acid, chlorate and chromate of potash. The dry salt disengaged ammonia when heated with soda lime, but the aqueous solution afforded no ammonia when treated with potash.

All these properties indicated that the organic base combined with hydrochloric acid must either be berberine or one very similar to it. Several careful analyses, the results of which agree with the known composition of berberine, have proved that this substance is really berberine, and that consequently the same organic base is produced in the root of the European *Berberis* and the root of the East Indian *Cocculus*.

This circumstance merits attention in a therapeutical point of view, since the berberine is present to a large amount in the Columbo root, and indeed to a much greater extent than the columbine. While the latter is almost insoluble in water and but sparingly soluble in cold alcohol, berberine is abundantly dissolved by hot water and by alcohol; so that in using an aqueous extract of Columbo, besides starch, berberine alone can be looked upon as the essential principle.

This occurrence of berberine in *Berberis* and *Cocculus* is also interesting in a botanical point of view. The true alkaloids, with the exception of caffeine, which however likewise differs from them in its behaviour, exhibit in their distribution a relation with the natural affinities of the plants. The views of botanists respecting the correct systematic position of the *Berberidæ* are still divided. Bartling arranges them with *Menispermæ* to which *Cocculus* belongs, and forms of these two families the class *Cocculinæ*

The production of the same peculiar vegetable principle in plants of the two families supports this view.

The peculiar vegetable principles to which the alkaloids belong are said nearly all to occur in the so-called laticiferous vessels, and never in the cells of the plant. A microscopic examination of the roots of *Cocculus palmatus* and *Berberis vulgaris* showed however that in both the berberine is deposited in the thickening layers of cellular membrane.

With respect to columbine, the small quantity procured by the author did not admit of his arriving at perfectly satisfactory results as to its composition. The mean of two analyses led to the formula $C^{14} H^8 O^5$.

From the mode of occurrence of columbine in the Columbo root it is probable that its production in the vegetable organism precedes that of the berberine, as the columbine is found only in the exterior and younger parts of the parenchymatous tissue, while scarcely any is observed where vascular bundles are developed.

If we suppose that the base has been formed from the non-nitrogenous body by the action of ammonia, a remarkable relation is evident between columbine and berberine on the one hand and picrotoxine and menispermene on the other. The basic menispermene occurs in the shells of the fruit of *Anamirta cocculus* which are exposed to the reducing action of sunlight; the picrotoxine is met with in the kernels. While in the present instance the formation of the base from the non-nitrogenous body is connected with a process of deoxidation, in the case of the root of *Cocculus palmatus*, which is protected from the sunlight, it is connected with a process of oxidation.

When 3 equivs. of oxygen are added to 3 equivs. columbine and 1 equiv. ammonia, and 9 equivs. water removed, the composition of berberine is obtained. The author is at present engaged with experiments in this direction.—*Chem. Gaz. from Journ. für. Prakt. Chem.*

ART. LXIX.—ON THE ESSENTIAL OIL OF MATRICARIA PARTHENIUM.

BY MESSRS. DESSAIGNES AND CHAUTARD.

THE plant was collected during the period of flowering, and the upper half, stem, leaves and flowers submitted to distillation; a small quantity of a greenish volatile oil was collected. The oil obtained in the dry hot summer of 1846 became filled in the course of twenty-four hours with large crystalline laminæ of stearoptene. No trace of stearoptene was obtained from oil distilled in 1845. The produce of the two years was united, and exposed to a temperature of 24° F., when it deposited numerous crystals. The stearoptene separated from the oil was strongly pressed between folds of paper, and then exposed to the air for several days. The mass, at first homogeneous and granulated, when thus deprived of oil became firm, brittle, and assumed a crystalline appearance. The pure stearoptene has a strong odour of camphor; it melts at 340°, boils at 399°. The stearoptene, when burned with oxide of copper, gave—

	Found.	Calculated.
Carbon	78.76	78.94
Hydrogen	70.60	10.53
Oxygen	—	10.53

It is consequently identical with the camphor of the laurels, the presence of which has already been pointed out by Proust in several volatile oils derived from the *Labiata*, and which is now shown to exist in a plant belonging to the *Compositæ*. The oil of *Matricaria*, separated from the camphor by the preceding operations, dried over chloride of calcium, and burnt, furnished carbon, 77.60, and

hydrogen, 10·37. Some oil prepared in 1847, and which had spontaneously deposited a small quantity of camphor, was dried over chloride of calcium and analysed; it gave 77·96 per cent. C, and 10·60 H.

The oil of *Matricaria* is evidently a mixture; even that which has been submitted to great cold still contains a considerable quantity of camphor. It began to boil at about 310°, but the thermometer rose rapidly to 400°, and the greater portion of the oil distilled over between 400° and 428°, leaving a coloured residue. The last half of the product, which had been collected between 394° and 428°, deposited, when submitted to a very low temperature, a large amount of camphor, which was separated. The oil was distilled several times over caustic lime, collecting the products at separate intervals; but no oil was obtained with a constant boiling-point. All the portions collected between 392° and 428° always afforded camphor on cooling, and sometimes to such an extent that the product of distillation congealed to a soft mass in the neck of the retort. We will enumerate a few of our analyses. I. is of oil collected between 310° and 334°; II. between 338° and 356°; III. between 390° and 420°; and IV. between 420° and 428°:—

	I.	II.	III.	IV.
Carbon . . .	86·46	85·77	77·02	76·92
Hydrogen . .	11·58	11·22	10·24	10·37

The volatile oil of *Matricaria* most probably contains, besides camphor, a hydrocarbon of the formula $C^5 A^3$, and an oil containing more oxygen than camphor.—*Chem. Gaz., from Jour. de Phar. et de Chim.*

ART. LXX.—PREPARATION OF SULPHATE OF PHILLYRENA
A NEW FEBRIFUGE.

Prof.. Jachelli, of Ferrara, has proposed the introduction into the materia medica, of the Phillyrea latifolia, and sulphate of Phillyrena, as a febrifuge. The incised phillyrena (6 kilogr.) is boiled for two hours in water (50 kilogr.) and concentrated sulphuric acid, (250 gram.) The liquid is filtered hot. This is repeated three times to exhaust the article. The decoctions are mixed, allowed to cool, and neutralized by lime. The precipitate is thrown on a filter and washed with cold water, then dried at a temperature from 40° to 50° R. It is then digested over alcohol at 36°, boiled for an hour in an alembic to collect the excess of alcohol; filtered while hot, the alcohol evaporated, and diluted sulphuric acid added to saturate the phillyrene. In a few days crystals will be deposited, which may be purified by animal charcoal. These crystals present the appearance of silken flock-like asbestos, of a light bitter taste. It is administered in the dose of three-fourths to one gramme in the apyrexia ten to fifteen grains.—*L'abeille Medicale*.

ART. LXXI.—THE BARK OF THE ADANSONIA DIGITATA, OR
BAOBAB TREE, A SUBSTITUTE FOR CINCHONA BARK.

By DR. DUCHASSAING.

ATTEMPTS have been made at different periods to find substitutes for the cinchona barks and the alkaloids obtained from them, as the use of these substances in medicine is not unattended with inconvenience. Among the inconveniences which apply to the use of the cinchonas, are, the bitter taste of their active principles, and the scarcity and consequent high price of the barks; moreover, when administered in large doses, their anti-periodic effects are often accompanied by considerable derangement of the system.

Dr. Duchassaing, in a paper published in the *Journal de Pharmacie* for June, has directed attention to the bark of the *Adansonia digitata*, or *Baobab tree*, as a valuable remedy for fevers, and capable of replacing the cinchonas.

This tree is a native of Senegal. It is placed by De Candolle in the natural order *Bombacææ*. It is a tree of moderate elevation, but whose trunk is of vast thickness, having a diameter of twenty or thirty feet. The fruit called *monkey's bread*, is acidulous, and is used by the natives in pulmonary affections, and as a common article of food.

The bark, which is the part now recommended to be used medicinally, is mucilaginous, but has scarcely any taste or smell.

Dr. Duchassaing recommends its administration in the form of decoction, made by boiling half an ounce of the bark in one pint of water, until reduced to two-thirds. This decoction is transparent, of a reddish colour, and has a smell slightly resembling that of decoction of cinchona bark. It contains a large quantity of mucilage, and has but little

taste. When sweetened with sugar, it is not at all disagreeable.

The principal inconvenience attending this form of administration, is, that the decoction soon undergoes decomposition. This may, to a certain extent be prevented, by adding a small quantity of sulphuric acid, which precipitates the mucilage, or by the addition of spirit.

According to Dr. Duchassaing, this remedy produces no appreciable disturbance to the nervous system. In some cases he has observed that it renders the pulse rather less frequent. It improves the appetite, and causes a determination to the skin.

In a great number of cases in which it has been applied as a remedy for intermittent fevers, it has proved eminently serviceable.—*Pharm. Journ.*

ART. LXXII.—NOTE ON THE BOILING AND DISTILLATION OF LIQUIDS IN GLASS VESSELS.

BY MR. THEOPHILUS REDWOOD.

Professor of Chemistry and Pharmacy to the Pharmaceutical Society.

IN a communication made to the Pharmaceutical Society about two years ago, "On the influence of Cohesion and Adhesion on the Boiling and Evaporation of Liquids," and which was published in this journal, vol. vi., page 119, I alluded to some cases in which it is found difficult to effect the distillation of liquids in glass vessels. This difficulty arises from the occurrence, in certain liquids, of the phenomenon commonly called *bumping*. It is frequently ex-

perienced in the process for preparing the *diluted hydrocyanic acid* of the London Pharmacopœia, and to a much greater extent in distilling oils and resins with spirit or water. My attention was more particularly directed to the subject in connexion with a series of investigations I had occasion to make with the view of determining the quality of some specimens of *balsam of copaiba*. Some of the results of these investigations are published in the journal, vol. vi., page 13. In attempting to effect the separation of the essential oil from the resin of the oleo-resinous balsam, by distilling it with water in a glass retort or flask, I found it impossible to continue the distillation for a sufficient length of time to complete the analysis, in consequence of the bumping which took place, and which became more and more violent as the process proceeded.

On repeating the experiments with other oils and resins, similar phenomena were found to occur. Thus, for instance, if a piece of common resin or of shellac be introduced into a globular flask nearly filled with distilled water, and if the water be boiled over the flame of a gas lamp, the ebullition will at first take place pretty uniformly; but after some time it will be observed that the bubbles of steam which are formed at the bottom of the flask, in contact with the most heated part of the glass, will be larger than they were in the first instance; and instead of their passing continuously through the liquid, there will be frequent intermissions, during which ebullition will entirely cease. After each of these intermissions the disengagement of steam will take place with increased violence, and as the process is continued, the length of the intermissions will become greater. If a thermometer be introduced into the flask, it will be found that this irregularity of ebullition is accompanied by great variations of temperature. While the bubbles of steam are passing freely through the liquid, the temperature will be from 212° to 214° Fahr., but when a

cessation of ebullition takes place, the temperature will rise and will sometimes reach 220° . This will be followed by a sudden and violent evolution of steam, constituting the phenomenon of *bumping*, by which the accumulated heat is disengaged, and the temperature of the liquid reduced again to its usual boiling point. The violence of these explosions will, after some time, become so great as to cause the projection of a considerable part of the liquid, at once out of the flask, endangering in no slight degree the safety of the operator. This may be taken as a forcible illustration of the phenomena which accompany the bumping of certain liquids when boiled in glass vessels; but the effects are seldom so marked as in this case.

Several attempts have been made to explain these phenomena, but without much success. They have been ascribed to a modification of the forces of *cohesion* and *adhesion* in the liquid, caused by the expulsion of atmospheric air during the process of ebullition; Donn   having shown that some liquids acquire greatly increased cohesive and adhesive force when air is wholly excluded from them. It may, indeed, be readily admitted that the immediate cause of the bumping of liquids is some modification of the forces of cohesion and adhesion; but that this condition is induced simply by the expulsion of air, is a position that will not be so readily assented to.

The effect appears to depend, partly on the condition of the liquid in which it occurs, and partly on that of the vessel containing the liquid.

It was found by Marcet, and I have repeatedly verified the results, that if pure water be put into a glass flask, which has previously had *oil of vitriol* heated in it, the boiling-point of the water will sometimes rise as high as 220° ; while, on the other hand, if the inner surface of the flask be coated with a thin film of *shellac*, the boiling-point of pure water heated in it will be sensibly below 212° . In

a metallic vessel the same liquid would boil precisely at 212° , and in a glass vessel, in its usual condition, without any previous preparation, the boiling-point would be a little above 212° . In these cases the boiling-point of the liquid appears to have some relation to the condition of the surface of the containing vessel, and to be unconnected with the presence or absence of air in the liquid.

There are other cases, as already shown, in which certain substances, dissolved or suspended in the liquid, occasion variations in the boiling-point as great as those noticed by Marcet. Some salts, and especially resins and oils, belong to this class; and it is worthy of remark that the same substance, *shellac* for instance, when spread over the surface of the glass, produces an effect the opposite of that which occurs when it is merely suspended in the liquid. In the one case the boiling point is reduced, while in the other it is raised to the extent of seven or eight degrees. But these variations, caused by the presence of substances dissolved or suspended in the liquid, do not occur in metallic vessels. The water containing shellac, which boils at 220° in a glass flask, if put into a metallic vessel will boil steadily at 212° , without the slightest tendency to bumping. Indeed, I have invariably found that liquids, the ebullition of which, in glass vessels, is accompanied by even the most violent bumping, present no such phenomenon when boiled in metallic vessels.

The effects which I have observed in a great number of cases have suggested the probability of their being connected with the electrical condition of the liquid operated upon, and of the vessel containing it. It is not my purpose, however, on the present occasion, to enter into any details with the view of explaining the cause of these phenomena, but to describe the means by which their occurrence may be prevented, and, moreover to describe an arrangement of

apparatus which I have found convenient for effecting the distillation of small quantities of *balsam of copaiba*.

Having observed that liquids, which are subject to bumping when boiled in vessels of glass, present no such effect if the process be conducted in those made of metal, I thought it probable that by coating the inner surface of the glass with silver, in the manner adopted by Mr. Drayton, the irregularity of ebullition alluded to would be prevented. This I have found to be the case, and I have repeatedly used glass flasks coated on the inside with silver, for the distillation of balsam of copaiba, without experiencing inconvenience from the bumping of the liquid. The method I have adopted for preparing the flasks has been to throw down the silver by Drayton's process, so as to cover the lower part of the vessel, while the upper parts are left unsilvered. This is effected by introducing as much of the ammoniacal solution of silver as will cover the part to be coated. After the silver has been deposited by the addition of the essential oils, it is necessary to clean the flask from adhering oil by means of rectified spirit, several successive quantities of which should be boiled in it until the silver becomes perfectly clean and bright, and no smell of the oil remains. When the process has been successfully performed, and every trace of oil removed, the coating of silver may be rendered thicker by depositing a fresh portion of metal, from a solution of oxide of silver in cyanide of potassium, by electricity.

Glass vessels may also be covered with platinum, by putting into them a solution of the chloride of that metal, adding thereto some *formic acid*, and then boiling the mixture. The coating of metallic platinum thus obtained, will not, generally, be so perfect and uniform as that of the silver deposited by the preceding process; but I have frequently succeeded in getting a deposit of perfectly bright platinum in this way, which has adhered very strongly to

the glass, and has not been separated by the action of strong acids and other substances repeatedly boiled in the vessel.

[We have omitted the description of an apparatus of which a figure was attached, used by Mr. Redwood for his experiments in the distillation of balsam of copaiba, which consists of a flask with a U tube for a receiver, connected with the flask by a small tube.—*Ed. Am. Jour. Pharm.*]

The introduction of pieces of platinum wire or clippings into the flask or retort has been recommended for preventing irregularity of ebullition in some liquids, especially in the distillation of *oil of vitriol*; but I have not found this to be a complete remedy for the evil alluded to in any case, and in most cases it appears to be of no use.

A French Chemist, M. Lambert, has proposed the employment of fragments of a species of quartz (*quarzite*,) which are to be introduced into the glass retort, in the distillation of oil of vitriol. It is stated that the presence of a few angular pieces of this substance in the retort will render the distillation of several pounds of the acid quite manageable and easy. I have not been able to ascertain with certainty what mineral is referred to by the name of *quarzite*, but I find that fragments of *rock crystal* produce the effect indicated remarkably well. Pieces of rock crystal suitable for this purpose, consisting of the chippings formed in making spectacle-glasses, may be obtained at a lapidary's or optician's. In all cases of irregular ebullition in which I have tried the use of this substance, it has proved completely successful. The effect of introducing five or six pieces of the rock crystal into a liquid, such as the mixture of balsam of copaiba and water, which cannot be distilled alone in a glass vessel, is most marked and satisfactory; the irregularity of ebullition instantly ceases, and the process may be continued for any length of time without a return of the bumping. This is certainly the most simple and easy method of preventing the evil alluded to.

It might be supposed that broken fragments of glass or sand would answer the same purpose as rock crystal; but such I have not found to be the case.—*Pharm. Journ.*

ART. LXXIII.—ON THE PRODUCTION OF FURFUROL.

BY GEO. FOWNES, F.R.S.

Professor of Practical Chemistry, University College, London.

IN the year 1845, I published an account of the artificial formation of a vegeto-alkali, resembling in many particulars those occurring in cinchona-bark, produced by the action of ammonia on a volatile oil, generated or developed by heating a mixture of wheat-bran and sulphuric acid. I was indebted to Mr. Morson for the oil itself so described; it had been in his possession several years, having been presented to him by Mr. Wm. Coley Jones, who had both discovered it and prepared it on a large scale, hoping to turn it to some practical use. Mr. Jones gave it the name *furfurol* from its origin, and published at the time a description of the oil and some of its peculiarities.

The examination of this substance soon showed its identity with an oily matter sometimes produced in preparing formic acid by the artificial process which had been noticed by Doebereiner, under the name of *artificial oil of ants*, and more carefully examined by Dr. Stenhouse, who succeeded in procuring it in larger quantity by distilling wheat-flour with slightly diluted sulphuric acid. The analyses of Dr. Stenhouse, which agree exactly with my own, assign to furfurol the formula $C^5H^2O^2$, or the triple of this, $C^5H^6O^6$

presenting the remarkable circumstance of a volatile oil containing hydrogen and oxygen in the proportions to form water.

When furfurol is put into a solution of ammonia, and the whole left to stand a few hours, combination takes place, and a yellowish-white, crystalline, insoluble substance is produced, containing $C^{15}H^6 NO^3$, or the elements of furfurol and ammonia, *minus* those of three equivalents of water. This substance is instantly decomposed by acids, with reproduction of furfurol and a salt of ammonia. From these characters I considered it allied to the *amides*, and named it accordingly *furfurolamide*.

When furfurolamide is heated with a solution of potash, no disengagement of ammonia or other evident mark of decomposition occurs, but an isomeric or molecular change takes place, and the furfurolamide passes into a new body, *furfurine*, having the same composition, but totally different properties, those namely of a powerful salt-base, capable of forming a series of well-defined and crystallizable saline compounds, having an alkaline re-action to test-paper, and even expelling ammonia from sal-ammoniac when boiled with a solution of that substance.

Since the preceding experiments were published, Mr. Jones has kindly favoured me with a description of his original process for preparing furfurol, with permission to make it known. This I do with pleasure, both on account of the interest attached to the chemical history of the product, and the ingenuity of the process itself, which is applicable to a variety of other purposes.

Wheat-bran to the amount of ten cwt. was cautiously mixed in a large wooden vessel lined with lead, with five cwt. of oil of vitriol, diluted with an equal bulk of water and still hot, the acid being added by small portions, with constant stirring, to avoid carbonization. The dark, pulpy, fruity smelling mixture was then immediately transferred

to another vessel, constructed in the same manner, of wood lined with lead, and furnished with a closely-fitting cover which could be made air-tight by luting. A pipe conveying steam passed to the bottom of this vessel, and there terminated in a flat coil perforated with numerous holes. A second pipe inserted in the cover, communicated with a condensing worm abundantly supplied with cold water. The joints of the apparatus being secured, the steam was admitted, and the distilled liquid, to the extent of six hundred gallons or more, collected in a suitable receiver. This liquid was a weak solution of furfural. On re-distillation two or three times repeated, until more water came over, the furfural began to separate as a heavy, yellowish oil, and by a repetition of this process, the whole was eventually procured: the ten cwt. of bran yielded about one gallon of crude furfural, or 7-28th part. Wheat starch-maker's refuse, or "grains," treated in a similar manner, yielded very pure furfural.

On repeating this operation on a very much smaller scale, I found it to succeed equally well. The distillatory vessel was replaced by a common stone-ware jar closed by a large cork, which held the mixture of bran and acid; steam was admitted from a small boiler by means of a perforated coil of pewter pipe resting on the bottom of the jar, while the vapours were conveyed away by another pipe to a condenser. Sixty-four troy ounces of bran, thirty-two ounces of oil of vitriol, and an equal bulk of water gave about one ounce of furfural. Two gallons of liquid were collected, and redistilled many times in the manner above pointed out; the first half only being received, until all the oil was separated. A third gallon contained very little of the oil, showing that it is unnecessary to collect more than about half a gallon of liquid for each pound of bran employed.

A number of experiments were next made with a view of discovering, if possible, the nature of the substance pre-

sent in bran, which, by the action of sulphuric acid, yields the oil. The following are the results, which, although not decisive, serve to narrow considerably the question. The process was in each case conducted in the same manner, and with the apparatus already described.

Fine Wheat Flour.—64 troy ounces of flour, 32 ounces oil of vitriol, and an equal bulk of water, yielded about $1\frac{1}{2}$ drachms of pungent and impure furfurol.

Potato Starch.—4 lb. of starch, 2 lb. sulphuric acid, and an equal bulk of water, gave merely indistinct traces of furfurol. The residue in the jar was a brown pulverulent substance, partly soluble in solution of caustic potash, and apparently a mixture of ulmine and ulmic acid.

Woody Fibre.—2 lb. new linen cut into small shreds and well washed with boiling water, 1 lb. sulphuric acid, and an equal bulk of water gave not the least indication of furfurol.

It was interesting to remark, however, the presence in the distilled liquid of a minute quantity of solid white volatile fatty matter, illustrating the universal diffusion of fatty substances in the vegetable kingdom, since they occur in such a body as linen thread. The residue in the jar consisted of brown insoluble matter, with a little unaltered fibre. This experiment was again repeated with a similar result.

Bran perfectly freed from starch, gluten, &c., either by being steeped in a cold dilute solution of caustic potash, or mixed with water only, and left to ferment, well washed and dried, yields a greatly increased product of furfurol. In one experiment 32 troy ounces of bran thus prepared, with the usual proportions of sulphuric acid and water, yielded 1072 grains of furfurol, or 1-14th of its weight. In a second experiment 80 troy ounces of the same gave 2959 grains of furfurol, or 1-13th of its weight. In the practical preparation of furfurol, therefore, should this ever become an object of importance, it will be very advantageous to adopt this

plan and to operate upon bran thus exhausted by either method, and afterwards dried in the sun, or otherwise. When mixed with the acid, the exhausted bran does not become pasty and adhesive, as happens with bran in its ordinary state; the mixture is thus more quickly and easily made and handled.

Other vegetable tissues besides bran yield furfural when thus treated, as beech-sawdust, of which 38 ounces, finely sifted, afforded not less than one ounce of the oil, very pure and free from pungency. From these experiments I am inclined to hazard the conjecture that the substance which yields furfural may possibly be the *matière incrustante* of M. Payen, which forms an important constituent of ordinary woody tissue. The bran, after exhaustion by potash, or by the lactic acid developed by fermentation, and well washed, is reduced to a mere membrane, which, under the microscope, exhibits a curious dark tessellated or spotted appearance, as if incrustated with regular and uniform patches of brownish opaque matter.

The following particulars may now be added to the description formerly given of the properties of furfural, some of which, from the small quantity then at my disposal, were open to correction.

When just distilled, it is nearly colourless, but in a short time becomes yellow even in the dark, undergoing but little further change. Exposed to light it becomes brown in a few hours. In the hydrated state or in contact with water, this change of colour occurs much more slowly. Pure furfural at 60° Fahr. has the specific gravity of 1.1648. In a glass retort, containing some strips of copper foil, it boils regularly and uniformly at 325° to 326° Fahr., the barometer standing at 29.9 inches. Some blackening and slight decomposition take place with every distillation. It dissolves in twelve parts of water at 60°, and is more soluble at higher temperatures, since a cold, milky, emulsion-like

mixture becomes clear on heating. The specific gravity of the cold saturated solution is 1.0132.

The specific gravity of the vapour of furfurol was carefully determined by the method of Dumas. A little patch of brown matter, the result of trifling decomposition, remained in the globe, but its weight must have been almost inappreciable. The following are the details of the experiment :

Weight of globe, 1347.63 grains.

Temperature of air, 64° Fahr.

Barometer, 30 inches.

Temperature of oil-bath, 380° Fahr.

Weight of globe after experiment, 1356. grains.

Capacity of globe, 23.13 cubic inches.

Residual air-bubble, .12 cubic inch.

Specific gravity of vapour, 3.493.

From this it follows that the formula for furfurol should be the very simple one, $C^5H^2O^2$, and not the triple of this, as formerly assumed, since every volume of vapour will be thus represented :

5 volumes hypothetical carbon-vapour*	. . . . .	.4183 × 5 = 2.0915
2 volumes hydrogen	. . . . .	.0693 × 2 = .1386
1 " oxygen,	. . . . .	= 1.1057
1 " vapour of furfurol	. . . . .	<hr/>3.3358

Pharm. Journ.

* On the supposition that carbonic acid contains equal volumes of oxygen and carbon-vapour, condensed to one-half.

ART. LXXIV.—ON CHROMIC ACID AS A BLEACHING AGENT,
AND ON A CHEAP AND EASY MEANS OF RECOVERING IT.

BY CHARLES WATT, Sen.

CHROMIC acid has of late years become a very important agent in the bleaching of various articles, and particularly tallow and oils, more especially palm-oil. The best method therefore of using and then recovering it, so that it may again be employed, and the expense of the bichromate of potash, every time the chromic acid is required, be saved, cannot fail to prove of great advantage to all large consumers of this article.

About twelve years since, after numerous experiments and much application, I found that no agent was so effectual for bleaching foul, dark and offensive tallows and deep-coloured oils (namely, palm, linseed and rape oils) as the chromic acid. My only consideration therefore was, in what manner to obtain it in the cheapest form sufficiently pure for the intended purposes; and the deep red salt, the bichromate of potash, was that from the decomposition of which I obtained the acid, in the following manner:—

To bleach half a ton of dark tallow or high-coloured oils, from five to ten pounds of the bichromate of potash is required, and from it the chromic acid is liberated by decomposing the salt thus:—

The bichromate, well-bruised, is put into an earthenware, wooden or leaden vessel (not iron, as the acids act on it,) and about four times as much hot water is then poured into it; the salt is then to be well stirred; afterwards about one and a half pounds of sulphuric acid (for every pound of bichromate) is carefully introduced, and the stirring is continued until the whole of the salt is dissolved. This liquid

is chromic acid, mixed with sulphate of potash and an excess of free sulphuric acid, which is found greatly to assist in the bleaching.

The next part of the operation consists in introducing it into the tallow or oil, which, previously melted and well settled from all extraneous vegetable and animal matters, and at about 130° F., is to be put into a vessel of wood capable of holding half a ton, leaving sufficient room for stirring. So soon as the liquid mixture of chromic acid, as before described, is poured into the tallow or oil, it is to be kept well stirred until the whole of the colour is removed, and a light pea-green has taken its place. The bleaching operation is now complete, and about four pailsfull of boiling water are to be poured in, and the stirring to be repeated for five minutes; the whole is then left to settle for about two hours, when it will be found quite white and fit for use.

It was formerly our custom to add about four or five pounds of muriatic acid to the compound; but Mr. C. Watt, Jun., at the large factory of Messrs. Hawes, found that it increased the trouble and expense, with no real benefit, and therefore he omitted it, and used only sulphuric acid to decompose bichromate of potash.

The expense of bleaching one ton of bad tallow, or any deep-coloured oil, is about £1; it therefore became necessary to devise means of saving the chromic acid; and some years since I converted the oxide contained in the green liquid, left after bleaching, into chromate of lead; but it was found that this article would become so extensive in quantity, that all who used much chromic acid, would be driven into another branch of business quite foreign to their usual occupation; and Mr. C. Watt, Jun., therefore devised the recovery of it into chromate of lime, equally as effectual as applied to bleaching, and much less expensive. His process is as follows:—

The green liquid, left after all the bleached oil is taken off, is put into another tub, and more water is added; then lime, made into a thick cream-like consistence, is gradually poured in till nearly all the sulphuric acid is saturated; the liquid is then run off into another vessel from the sulphate of lime, and into this liquid is to be gradually and carefully introduced some more of the cream of lime, till all the green oxide (powder) is precipitated, and the liquor is clear and colourless; this liquor is to be drained off, and fresh water poured in, and, when settled, it is again to be poured off, and a fresh quantity put in, in order to wash the precipitate; this is at last to be dried, and then put on an iron slab, heated to redness, and kept frequently stirred. From a green it will be gradually changed into a yellow powder, which is the chromate of lime, and which, by being decomposed by sulphuric acid in such quantity as to leave an excess of free sulphuric acid, yields chromic acid, quite as well adapted for bleaching, as that obtained from the bichromate of potash.* By this process the chromic acid can be recovered again and again, *ad infinitum*; and thus the method of bleaching by this agent is at once the most perfect and economical of any yet brought into operation.† It is almost needless to remark, that where, as in the great manufactories in Lancashire, much chromic acid is employed, this easy and cheap mode of recovering it will prove highly beneficial.

It may here be remarked, that several other methods of bleaching tallows and oils have since been tried. One consists in employing what is termed permanganic acid; but this agent so readily parts with its oxygen, that it is un-

* This process is perfectly identical with that described by M. Jacquelin in our fifth volume, p. 452.—ED. *Chem. Gaz.*

† The patent for bleaching and purifying dark tallows and deep-coloured oils was taken out about twelve years ago by the writer.

manageable, and is quite as expensive and much more troublesome. Another method is by blowing air through the goods, heated to a certain point. This also is found not so effectual as the chromic process, for there is considerable waste, and when made into soap the colour is much inferior.—*Chem. Gaz., from Newton's Journal.*

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

At a Stated Meeting of the Philadelphia College of Pharmacy, held at their Hall, Ninth Month, 25th, 1848. Present seventeen members. The President in the Chair.

The minutes of the Board of Trustees were read and approved. The name of Athanase Roidet was proposed as a Resident member by the Board, and the College proceeded to the election. The tellers reported he had received the requisite number of votes, and he was declared duly elected.

The Committee on the Adulteration of Drugs made the following Report, which was accepted, and the Committee continued.

To the Philadelphia College of Pharmacy.

The Committee continued from the last meeting, having in charge the subject of adulterated drugs, &c., and the preparation of a book of tests, &c., for detecting adulterations; beg leave to state, that since their last report the favourable action of Congress has been had in reference to imported drugs, and the bill has become a law and is now in operation.

Your Committee have every reason to be satisfied with the powers of the bill, and believe, if properly enforced, it will be productive of great benefit to the drug market.

In regard to the "Book of Tests," your Committee are not prepared to report, and ask to be continued.

On behalf of the Committee,

DANIEL B. SMITH, Chairman.

The Committee on Latin Labels are continued to report when prepared.

The Committee on the Cabinet of Specimens made the following report, which was accepted, and the sum of fifty dollars, in addition to the former sum of that amount, was appropriated to their use.

To the Philadelphia College of Pharmacy.

The Committee appointed at the last general meeting in reference to the Cabinet of Specimens, &c., report : that they have not as yet proceeded with the arrangements for containing the collection of specimens, owing to the insufficiency of the appropriation fully to cover the cost of the cases, bottles, &c. They therefore ask an additional appropriation of fifty dollars, to be called for during the next year, and believe that they will then be enabled to carry out the objects of their appointment in a satisfactory manner.

On behalf of the Committee,

CHARLES ELLIS,

SAMUEL F. TROTH,

EDWARD PARRISH,

WILLIAM PROCTER, JR.

The Committee appointed to distribute the Code of Ethics, and to confer with a Committee of the College of Physicians on matters connected with the interests of both

professions, made the following report, which was accepted and they continued.

To the Philadelphia College of Pharmacy.

The Committee to whom was referred the subject of the Code of Ethics, and who were authorized to confer with the Committee of the College of Physicians, report :

That they have caused to be printed and circulated, the " Code of Ethics " as adopted by the College, both in the form of cards for the use of the members, and in the Journal for general circulation. They also sent copies of it to the College of Physicians, and to the National Medical Convention, which bodies, we understand, have viewed it favourably.

The Chairman of this Committee having received a communication from the Committee of the College of Physicians, (signed by Drs. Condie, Jackson, and Bond,) stating their readiness to confer with us on subjects interesting to both professions, a meeting was appointed at the College Hall, which was attended on their part by Drs. Bond and Jackson. Dr. Condie being absent, his colleagues were not prepared to offer any subjects for the consideration of our committee. On our part a paper under the head of " Points worthy of notice in a conference with the committee of the College of Physicians," was read. It was intended to be merely suggestive of topics for discussion. A copy is appended.

The gentlemen of the College of Physicians appeared to admit the importance of most of the " points " suggested, but did not seem disposed to propose any course of action in regard to them. The joint committee adjourned with the understanding that the College of Physicians committee should be furnished with a copy of the " Points for Con-

sideration," and when they were prepared to meet us again, to inform the chairman.

On behalf of the Committee,

DANIEL B. SMITH,
SAMUEL F. TROTH,
DILLWYN PARRISH,
H. C. BLAIR,
WILLIAM PROCTER, JR.

The following proposition was submitted, and on motion was laid on the table for consideration at the next stated meeting.

To the Philadelphia College of Pharmacy.

The undersigned propose to alter Law fifth, Section second, of the laws of the College, so as to read as follows:

Section 2d. Any graduate of Pharmacy, producing the diploma of a respectable College of Pharmacy, and conforming in his professional conduct to the Code of Ethics adopted and published by this College, shall be eligible to resident membership by vote of the Board of Trustees in the manner prescribed by the By-Laws of the Board.

Any apothecary of known qualifications, removing to this city from a locality where it would have been impracticable to obtain a diploma, and subscribing to the aforesaid Code of Ethics, or any reputable member of the medical profession, being recommended by the Board as a candidate for election, may be elected a resident member by an unanimous vote of the College.

JOSEPH C. TURNPENNY,
WILLIAM J. JENKS,
AMBROSE SMITH.

The College then proceeded to the election of eight Trustees. Daniel S. Jones and Robert Shoemaker were appointed tellers, who reported that the following members

had received the number of votes necessary for an election, whereupon they were declared duly elected.

Thomas P. James,

Jacob L. Smith,

Ambrose Smith,

Alfred B. Taylor,

Robert Shoemaker,

John Harris,

William J. Jenks,

Caleb H. Needles.

Then adjourned.

DILLWYN PARRISH, Secretary.

Editorial Department.

ACT OF CONGRESS ON ADULTERATED DRUGS.—Our readers will perceive that we present them a copy of the Drug Bill recently passed by Congress, the Circular of the Secretary of the Treasury department to the Officers of the Customs, together with a preamble and resolutions issued by the New York College of Pharmacy, addressed to their members and others, recommending a strict construction of the law, &c.

When we consider the crying evils which have so long existed in this department of foreign importations, and the almost unprecedented unanimity with which Congress acted in passing the Bill, we cannot but believe that the time has now come for a new order of things amongst us. We trust that soaked rhubarb, *remade* opium and scammony, and 7 per cent blue mass, will no more be seen in our warehouses, and that the retail dealers will take proper means to see that these evils, greatly heretofore of foreign growth, be not transplanted amongst us. We are not of those who believe that adulterated drugs are solely of foreign origin. The men who will buy up rhubarb that has soaked for two weeks in the waters of the ocean in a sunken vessel, dry and powder it, and then disseminate it through the country, (and there are such in our midst,) will not scruple to adulterate opium, blue mass, or any equally important remedy, if they can only do it so as to avoid detection. Therefore, whilst we rejoice in the advance made by the act of Congress, we would urgently press upon those country physicians and retail dealers, who *really desire to have pure medicines at fair prices*, to take every means to improve their knowledge of drugs, and to expose any impositions to which they may be subjected.

Some years ago the business of sophisticating drugs was carried on to so great an extent in Great Britain, that the matter claimed the attention of Parliament; whose committee with proper powers entered into an investigation of the evil. In the testimony that was adduced it was shown, that the difficulty arose as much from the consumer as the manufacturer.

The competition between the retailers in the country towns, brought about by the people buying on the cheap principle, induced them to urge the city druggists to send them drugs and chemicals that they could sell at a stated price. The druggist writes to the manufacturing chemist that his customer wants nitrate of silver, blue mass, mercurial ointment, etc., at a certain price, and queries if he can make them at a figure low enough for him to get a profit. We believe that this state of things exists amongst us, and is largely the cause of the very importations against which the Act is levelled. In our country villages, both east and west of the Alleghanies, a large amount of medicines are sold by country store keepers who know as much about bark, rhubarb, and opium, as they do about algebra or conic sections. They bring the same rule to bear on these important remedies as they apply in purchasing mustard and spices, and are treated accordingly. There are hundreds of persons who are nominally apothecaries, over the country and towns, who are little better; and in coming eastward to make their purchases have a tariff of prices to hold up to the druggist who may expect their patronage. Unfortunately, competition is so great that many are compelled to forego all profit, or sell bad articles, a temptation sorely trying to men who have families to support.

In reference to the working of the Act, much will depend on the ability and the integrity of the officers in whose hands the government commits it for enforcement; as well as on the principles adopted in the inspection. We believe it is highly important that these gentlemen should act with the most perfect unanimity in their examinations; that the standard for New York, should correspond with those of Boston, Philadelphia and Baltimore, else there will be no certainty in the result. In view of this, a frequent correspondence between these officers would be productive of advantage, and it is very desirable that they should see the importance of keeping such full and lucid records of drug importations, both in reference to weight and value, that their registers will be an invaluable statistical table.

We understand that Dr. Baily has the appointment for New York, and Dr. David Stewart that of Baltimore, whilst in this city our colleague, Alfred B. Taylor, is the incumbent. We have not heard of the appointments for the other ports, but have reason to be satisfied with the gentlemen above named. They will have an onerous and perplexing duty to perform until the standard for judging certain drugs and chemicals is definitely settled by experience, and whilst we urge them to adopt a fair and safe ratio of strength, would recommend that every facility, consistent with a conscientious discharge of duty, be conceded to

importers in the *first period* of their action. We learn from our friend John Milhan, President of the New York College of Pharmacy that "So far, there have been no serious objections evinced, on the part of importers, to the practical application of the law. Some difference of opinion exists as to the per centage of morphia which good Turkey opium should contain, to entitle it to pass the Custom house. The Inspecting Officer of this Port inclines to the belief that 9 per cent should be the minimum standard." "This, we will admit, is an article of such importance to the physician that it should never be admitted into the country except it be of sufficient strength to be available at the ordinary doses. As matters have been, we have such reason to fear that the better kinds of opium were purchased by the manufacturers of morphia; the inferior qualities remaining to supply the various forms under which opium is administered." It would be very desirable that no opium containing less than 9 per cent. of morphia should be used; but we fear that a very large proportion of so called prime opium will not reach this strength. The frequent essaying of these products will soon give us the true state of the opium market, and a standard can then be fixed on a rational basis. And so in reference to other articles of an organic nature, containing active principles.

PRESCRIPTION BLANKS.—In our last number we noticed a prescription blank, suggested by our friend Edward Parrish. The idea appears to have been approved by apothecaries, as we observe numerous *editions* have been issued by others, differing little from the original suggestion. In some, however, we observe the apothecary's name has been attached, which is in our opinion so objectionable a feature as to induce us to suggest to our pharmaceutical brethren its indelicacy. There is no physician whose practice is confined to one neighborhood and they cannot be expected to carry a variety of blanks to suit the various districts or stores; hence in using such blanks he is subjected either to the necessity of removing the name, or to the implication of being partial in his patronage.

VALLÉ'S PILLS OF CARBONATE OF IRON.—Every apothecary is aware that however consistent the mass pill, ferri carb.; of the U. S. P. may be at the time it is made into pills, its deliquescent nature soon causes them to attract sufficient moisture to soften and run together in damp weather. We have found it very convenient to prepare a quantity of the officinal pills in the following manner, viz.: We take a plate of tinned iron, place on it as much of the mass as is sufficient

for two or three hundred pills, and hold it at such a distance above a lamp or other source of heat as is sufficient to cause evaporation, whilst the mass is constantly kept in motion with a spatula, observing that no carbonic acid is evolved by too great a temperature. As soon as a small portion of the mass will splinter after cooling, when crushed, the plate is removed and the hot mass made up rapidly into pills of three grains each, which are kept closely stopped in a bottle. When more than a dozen of these pills are dispensed in a prescription they should be enclosed in a wide mouthed vial which prevents all chance of deliquescence.

NITRATE OF SILVER.—We are often called on by physicians to point a stick of lunar caustic for convenient use. Several modes are in use: by solution, by mechanical force, and by casting in a mould; but by far the most expeditious and easy method is the following: Take a silver coin, (say half a dollar,) hold it with a pair of forceps over the flame of a lamp until it is hot enough to fuse the nitrate, then having the cylinder of caustic in the right hand, between the thumb and index finger, holding it at an angle of 30 or 40 degrees with the surface of the coin, pressing the point on the latter and turning the cylinder as the part in contact fuses off. A little practice gives great dexterity; and a point of any required acuteness may be obtained, whilst the excess of the salt on the surface of the coin can be returned to the bottle.

PHARMACEUTICAL APPARATUS.—M.M. Weiss and Schively, importers of this city, have recently received from Lowig of Germany, a set of pharmaceutical apparatus which exceeds anything of the kind that we have before examined. It consists chiefly of a furnace, copper boiler, block tin still, block tin vessels, for infusing, boiling and evaporating by steam heat, varying in size from a pint to several gallons, and most of them fitted with block tin covers. Besides there are porcelain vessels and iron dishes; at one side is a large copper reservoir for water, which equally supplies the boiler and refrigerates the condenser, and the still is so arranged that a current of steam may be passed under a diaphragm within it as is proper in the distillation of certain plants and distilled waters. The whole is got up in a most elegant style, and is calculated for the conduction of a variety of operations at the same time. The whole arrangement is got up with a view to satisfy the law of the Prussian government, recently promulgated, which requires the Apothecaries to make all imprisms, decoctions, and in tin vessels with steam heat.

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